Beliefs, Attitude, Skills and Knowledge Study

Maldives Report

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

Villa College, Maldives

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Supported By

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Authors:
Dr. Aishath Nasheeda, Lead Researcher (MATPD), Assistant Professor, FES, VC.
Ms. Mariyam Nihaadh, Researcher (MATPD, Senior Lecturer, FES, VC.
Ms. Aishath Zuha, Project Manager (MATPD), FES, VC.
Ms. Fathimath Saeed, Associate Dean, FES, VC (Principal Investigator, MATPD)
Ms. Udhuma Abdul Latheef, Researcher (MATPD), Head of School, School of Computer Science, FET, VC.
Ms. Mariyam Nazviya, Researcher (MATPD), Director, Policy and International Relations, VC.

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Faculty of Educational Studies (FES)
Villa College, QI Campus
Rah Dhebai Hingun,
Male', 20373, Maldives
Tel: +960-330 3200
Email: info@villacollege.edu.mv
www.villacollege.edu.mv/

Research Team

Ms. Fathimath Saeed
Principal Investigator

Ms. Aishath Zuha
Project Manager

Assistant Professor Dr. Aishath Nasheeda,
Lead Researcher

Ms. Mariyam Nihaadh
Researcher

Mr. Abdul Sattar Gasim
Researcher

Ms. Udhuma Abdul Latheef
Researcher

Ms. Mariyam Nazviya
Researcher

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List of Acronyms

BASK	Beliefs, Attitude, Skills and Knowledge
GESI	Gender Equality and social Inclusion
ICT	Information and Communication Technology
MATPD	Multimodal Approach to Teacher Professional Development
NIE	National Institute of Education
PD	Professional Development
PLC	Professional Learning Community
SATE	South Asian Teacher Educators
TPACK	Technological pedagogical Content Knowledge
TELTA	Technology Enabled Learning for Teachers & Adolescents
TISS	Tata Institute of Social Sciences
TLP	Teaching Learning Practices
TPD	Teacher Professional Development

Executive Summary

It is crucial for educators to be up-to-date with the advancements in education and especially with regards to emerging trends in education. Therefore, professional development plays a major role in catering to this demand. As part of the "A Multimodal Approach to Teacher Professional Development (MATPD) in Low Resource Settings" project, fifteen fellows from each participating country, namely Afghanistan, Maldives and Nepal, took part in a 10 months long South Asian Teacher Educators' (SATE) Fellowship. The aim of the fellowship was to develop the capacities of educators for leading distance teaching and learning experiences; empower fellows to use action research to develop contextualised solutions for teaching-learning; and develop skills of mentoring among fellows to support teachers collaboratively. It is designed for under-resourced and developing contexts with a collaborative adaptation to suit the national contexts of the participating countries in South Asia. With the usage of diverse technologies, modalities for Teacher Professional Development (TPD) that are context-appropriate and combined with action research and social change through the formation of Professional Learning Communities (PLCs) while building on the communities of practice that exist or get developed through mobile based chat groups were introduced.

To understand the fellows' beliefs, attitudes, skills and knowledge towards the professional development themes explored in the fellowship, a mixed method research approach was adopted. Data was collected pre and post fellowship activities to understand the change in Beliefs, Attitude, Skills and Knowledge (BASK) of fellows. Thus, the study took place in two phases: baseline and endline. Baseline data was collected through surveys and interviews prior to the fellowship training to understand their current beliefs, attitudes, skills and knowledge on different themes related to Professional Development (PD). The fellowship training consisted of training in mentoring, reflection, use of Information and Communication Technology (ICT), action research, and Teaching Learning Practices (TLP). At the end of the fellowship, endline data was collected through surveys and interviews to observe the changes in belief, attitudes, skills and knowledge of the fellows on TPD.

The study revealed interesting findings in the change in BASK of the fellows who participated in the fellowship. The baseline data suggest that fellows had somewhat mixed attitudes, limited knowledge and understanding on concepts like the project, action research, mentoring and use of learning communities. They also had differing views on the use of ICT in the classroom and inclusion. However, after the fellowship the endline findings revealed a shift in their beliefs, attitudes, skills and knowledge on all areas that were covered in the fellowship training. Additionally, fellows had developed the efficacy to conduct action research and engaged in mentoring, as they had the chance to experience the role of the mentee during the fellowship process. Implications drawn from the study are for policymakers to strategize means for

enhancing the professional development of educators. This can aid educators to adopt innovative approaches within their classrooms. Furthermore, TPD in the Maldives to focus on training teachers for collaboration, conduct action research, engage in mentoring, develop knowledge of inclusive pedagogical and teaching practices. TPDs to be designed with scalability in mind for sustainability, and policy support.

SECTION I: INTRODUCTION

Introduction to Belief, Attitude, Skills and Knowledge Study

It is crucial for educators to be up-to-date with the advancements in education and especially with regards to emerging trends in education. Therefore, professional development plays a major role in catering to this demand. As part of the "A Multimodal Approach to Teacher Professional Development (MATPD) in Low Resource Settings" project, fifteen fellows from each participating country, namely Afghanistan, Maldives and Nepal, took part in a 10 months long South Asian Teacher Educators' (SATE) Fellowship. The aim of the fellowship was to develop the capacities of educators for leading distance teaching and learning experiences; empower fellows to use action research to develop contextualised solutions for teaching-learning; and develop skills of mentoring among fellows to support teachers collaboratively.

Data was collected pre and post fellowship activities to understand the change in Beliefs, Attitude, Skills and Knowledge (BASK) of fellows. Hence, the objective of this BASK study is to address the following research questions:

Research Questions

1. What are the beliefs and attitudes of the fellows with respect to the use of Information and Communication Technology (ICT), action research, mentoring for supporting Teacher Professional Development (TPD)? What are changes in beliefs and attitudes as a result of the participation in the fellowship ?
2. What is the level of confidence among the fellows in the skills and knowledge required for the use of ICT, action Research and mentoring for supporting TPD? What is the change in skills and knowledge of the fellows as a result of fellowship participation?
3. What are the levers and barriers for supporting pedagogically rich distance learning methodology for scaling an innovative TPD model?

Overview of the BASK Study Report

This study is organised into four main sections.

Section I. The first section presents an introduction to the MATPD project, SATE fellowship program and the theory of change framework which guides this study.

Section II. The second section provides an explanation of the design, research methods, sampling, means of data collection and tools designed for the study and the approach to data analysis. The demographic profile of the fellows is also included in this section.

Section III. The third section presents findings on the changes in fellows' knowledge, skills, behaviour and attitude, pre and post the MATPD intervention. The findings have been presented with regard to the themes of the MATPD project which include Professional Development (PD) experiences, action research, mentoring, reflection, social learning, ICT and Gender Equality and Social Inclusion (GESI).

Section IV. The final section of this study comprises the discussion, conclusion, references and the appendices.

The South Asian Teacher Educators Fellowship

Overview of the SATE Fellowship

The SATE fellowship was conceptualised based on the gaps identified from the Landscape Mapping Study (LMS) done at the initial stage of the project. These gaps include

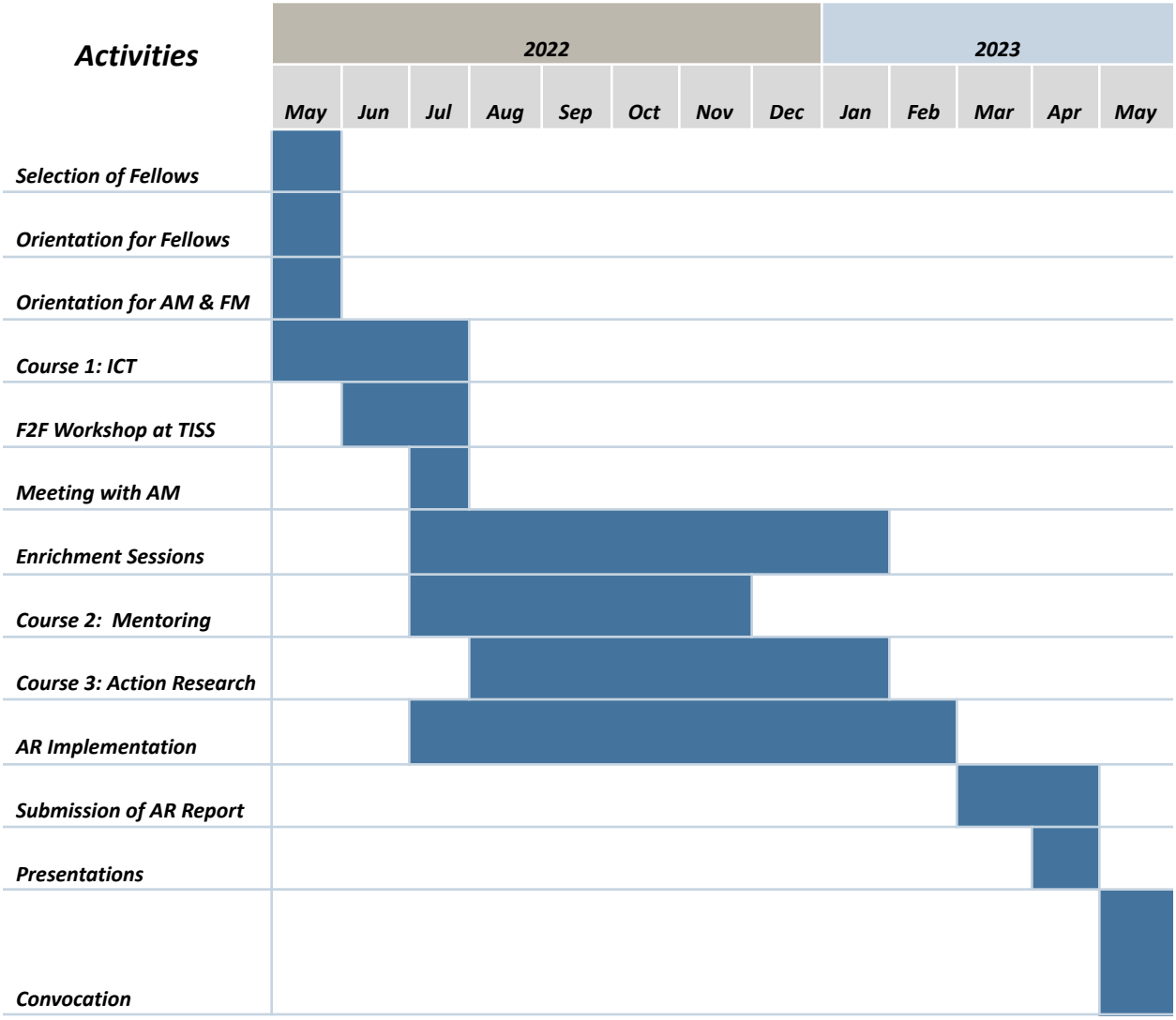
- Lack of research culture among teachers.
- Although workshops on action research have been conducted by the National Institute of Education (NIE) of Maldives, teachers have not engaged much in reflective practices. Therefore, more PD on AR and making teachers more aware of its importance is required.
- Another important area that lacked adequate focus was mentoring. Findings from LMS revealed that mentoring was practised informally in few schools and to a limited extent. Hence, this identified a need for opportunities for teachers to engage in mentoring as well as being mentored.
- Due to the dispersed nature of Maldives, distance modes of teaching and learning are indispensable to the delivery of equitable education throughout the country. However, despite the numerous training it was evident that teachers are still reluctant to utilize the full potential of ICT in meaningful ways.

These shortcomings have paved the way to the conceptualization of the SATE fellowship to cover PD in much needed areas.

The SATE fellowship program aims to address these gaps and build the capacity of mid-level functionaries as professional leaders through:

1. Practice based continuous PD opportunity for teacher educators and teachers which supports social learning from peers and experts.
2. Addressing contextual problems through action research and enabling agency of teacher educators.
3. Enabling South-South collaboration and learning among South Asian countries.

Table 1
Fellowship Activities Timeline



Onboarding of Fellows & Orientation

Participants for the fellowship were selected based on the following criteria.

- Participants should have been a teacher at one point in their career
- Participants should be familiar with conducting action research
- Participants should be selected from among teachers, leading teachers, principals, teacher educators and educational administrators
- Participants should be from different schools and higher education institutions.

Refer to Appendix A for the profile of fellows.

An orientation session was held at Villa College for the 15 fellows and three field mentors from Maldives. Fellows who were from outer islands joined the session online, while those residing in the Greater Male' region joined physically. In the session, the fellows were briefed about the MATPD project and different phases, and their roles and responsibilities of the fellowship. A handbook on the fellowship was also shared with the fellows.

Courses

Throughout the fellowship journey, fellows undertook three courses from the TISSx platform. The fellows started the fellowship with course 1 in May 2022. They were enrolled in Course 2 and 3 after a face to face workshop in July and August 2022.

- Course 1: Using Educational Technology for Constructive Teaching & Learning
- Course 2: Mentoring for TPD
- Course 3: Action research

Face to face workshop

Fellows from Maldives travelled to Tata Institute of Social Sciences (TISS), Mumbai, in June 2022 to attend the 10 days face to face workshop. The sessions focused on TPD issues and challenges in the three participating countries along with action research, mentoring, well-being of teachers, toy making, designing collaborative modes of TPD, inclusive pedagogy, exploring clix resources, Technology Enabled Learning for Teachers & Adolescents (TELTA) project, analysing classroom videos and institutional visit to TELTA project and Gateway School. The resources at the Educational Resource Centre at TISS were also viewed during their visit. Discussions revolved around educational contexts of the countries and Fellows were given the opportunity to interact with their field mentors and academic mentors. The fellows had to present their draft proposals of the AR they were to implement after going back to their respective countries. This helped them gain feedback to improve their drafts before implementing them.

Enrichment sessions

A series of enrichment sessions were also part of the fellowship which were curated based on the needs of fellows to support them in their action research study. The sessions were conducted weekly, based on the availability of fellows from the three countries. (Refer to Appendix B)

Implementation of Action Research

The fellows were required to carry out action research collaboratively with 5-10 teachers to address local educational issues in their country contexts and submit a project report at the end. The fellows had to choose to work on any one of the prescribed six themes (Language, Math, Science, OERs, Peace, Social inclusion & Gender). The Maldivian fellows conducted their action research on all the themes except in Math Education.

All 13 fellows worked with a total of 73 school teachers across 19 schools for their action research. Their action research were mentored by their Academic mentors and guided by Field Mentors from their respective fields.

Interactions with Academic mentors and Field mentors were conducted through various platforms like whatsapp, telegram, facebook messenger, viber and email. The fellows were also provided guidance by the Consortium team through reflective sessions and presentation sessions, which helped to address any concerns and challenges during the implementation of the action research. Additionally, Telegram groups were created for each theme, with fellows and field mentors for the respective theme. This was to encourage fellows communication across the three countries, to share ideas and their work.

At the end of the fellowship the fellows submitted recorded presentations of their action research, followed by their action research reports.

Theory of Change

The MATPD project aims at building the capacity of the various stakeholders involved at the mid-level to become professional leaders who can bring about a change in their beliefs and practices in the teaching profession. The Theory of Change provides a framework that explains how all the significant elements together can contribute to achieve the intended aim/goal.

The stakeholders mentioned in the framework are mid level functionaries, including school leading teachers and principals, government officials, NGO members and teacher educators. They had undergone four main phases: online learning through TISSx platform; social learning through synchronous and asynchronous interactions; practical learning by conducting collaborative action research with school teachers; and contextualisation by learning to adopt and adapt to challenges in under-resourced contexts.

The overall outcomes of the framework was to create positive changes in stakeholders' beliefs, attitudes, skills and knowledge, build their professional leadership skills, increase collaboration, and enhance competency to come up with contextualised solutions to teaching and learning practices.

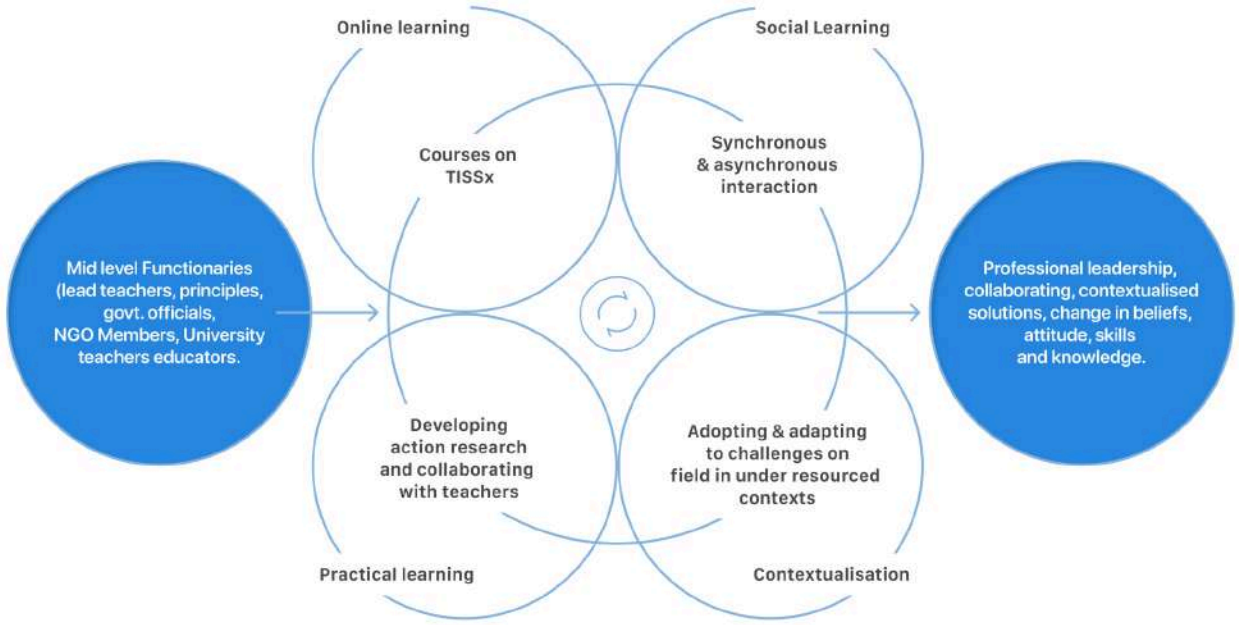


Figure 1
Theory of Change Framework

SECTION II: METHODOLOGY

Research Methodology

To understand the BASK, a mixed method research approach was adopted. The study took place in two phases: baseline and endline.

Baseline data was collected through surveys and interviews prior to the fellowship training to understand their current BASK on different themes related to PD.

Subsequently, the fellows took part in the fellowship training that consisted of training in mentoring, reflection, use of ICT, action research, and Teaching Learning Practices (TLP).

At the end of the fellowship, endline data was collected to observe the changes in belief, attitudes, skills and knowledge of the fellows on TPD.

A sample size of 15 educators were selected including five fellows from outer islands. Although 15 educators took part in the fellowship, two were unable to continue the fellowship. Hence, only 13 remained till the end.

Data Collection Tools

Data for baseline and endline was collected using google survey form, online and face to face interviews.

Survey Forms

Each of the administered six survey forms covered different themes of PD. They are:

1. PD Experience and Beliefs of Teacher Educators - Collaboration and Reflection
2. Beliefs, Knowledge and Skills about ICT
3. Beliefs, Knowledge and Skills about action research
4. Skills for Teacher Educators - Mentoring
5. Knowledge and Beliefs about Professional Learning Communities (PLCs)
6. Beliefs about teaching learning process including Gender Equality and Social Inclusion (GESI)

Interview Guide

A semi-structured interview guide was also developed for both the baseline and endline interviews by the research consortium. Findings from the landscape mapping were used to develop the interview guide.

Process of interview guide development

The research consortium brainstormed on different themes to generate and align the interviews with the research objectives. The process for discussing and drafting the interview guide lasted for 3 weeks. The interview guide was then piloted to validate questions that were formulated to generate the intended responses. The pilot test interview was also timed to check the duration for the interviews. During the pilot a few questions that were confusing and repetitive were identified, hence, they were revised and finalised (See Appendix C). The baseline and endline interview guides had slight variations to cater to the evolving changes that took place. The interview guides were aligned with the themes of PD explored in the survey forms.

Data collection process

Baseline Study

Prior to the fellowship training, the research team conducted a baseline study, to understand the current BASK of the selected 15 fellows. An initial baseline interview that lasted between 30-45 minutes was conducted with each of the 15 fellows. Interviews were conducted online via google meet while some interviews were conducted face to face. The main reason for the online interviews were because some teacher educators were working in remote Islands away from Male' city. All interviews were conducted in English and audio recorded. The interviews were then transcribed. The transcriptions were later validated for accuracy after listening to the recordings.

In addition to the interviews, several other data points were utilised for the baseline throughout the fellowship. Hence, six online survey forms that covered 8 different themes (TPD, Reflection, Collaboration, Mentoring, action research, TLP, ICT, PLCs) were administered to the teacher educators.

Furthermore, a 'Community of Practice' was established, via telegram group, to help facilitate the professionals' engagement with each other, regarding the learnings and experiences of the SATE fellowship and the action research they had conducted, this platform facilitates in collecting data for the theme 'social learning'.

Endline Study

Endline interviews were conducted for the remaining 13 fellows who were still active at the end of the fellowship. It was observed that endline interviews took more time than the baseline interviews as the interviews were conducted after the TEs have completed their Action Research component.

Table 2
Data Collection Process Timeline

	Baseline	**Endline**
Number of Participants	15 Fellows	13 Fellows
Time Period	- Survey: 12th -25th May 2022 - Interviews: 2nd -8th June 2022	- Survey: 20th -28th March 2023 - Interviews: 27th March - 25th April 2023
Average Interview Duration	30 - 45 Minutes	1 - 1.5 hours

Data Analysis

Qualitative

Data for baseline and endline interview data were analyzed using the framework analysis method.

Framework analysis was developed by generating predetermined themes and categories that were derived from the research objectives and questions. Based on the developed framework, a code book was created in an excel spreadsheet to keep track of all the codes. During the analysis process, several new codes emerged and were added to the code book (See Appendix D for the codebooks). The codes were then re-organized to make more sense from the emerging codes. The data analysis process was done both manually and using NVivo, as some researchers felt more comfortable analyzing data manually. The following process was followed during the data analysis process to keep the consistency of the coding process.

- Step 1: All the interview transcripts were read and re-read by the respective research teams to familiarise with the data.
- Step 2: The coding framework was applied to identify the codes from the interview transcripts. The code book was updated by all the researchers as and when new codes were identified.
- Step 3: The codes were then examined to map the relationship between different themes and categories, this is to see which codes were overlapping with the different themes.
- Step 4: All research teams shared the analyzed data with each other for verification. This was a crucial process to maintain the accuracy and monitor drifts in the data analysis process.
- Step 5: Reporting the findings by summarizing the key themes and providing interpretations based on the findings.
-

Quantitative

Statistical Package for Social Science (SPSS) software and excel were used to analyze the data collected from the baseline and endline surveys. Since, the majority of the questions are likert scale questions, data was analysed descriptively. To compare any differences in baseline and endline data in each theme, the data was checked for normality, followed by the calculation of *Cronbach Alpha* value and performing paired sample t-test where required. Regarding the feasibility of conducting paired sample t-test with extremely small sample sizes, de Winter (2019) states that it was found to be suitable specially with higher within-pair correlation coefficient. This indicates that paired sample t-test is adaptable to constraints of sample size. Additionally, Heo, Kim and Faith, (2015) emphasizes the importance of using instruments with greater Cronbach Alpha value or greater inter-item correlations, which measure the internal consistency of parallel instruments such as the baseline and endline survey used in the this study to measure constructs such as beliefs, attitude and knowledge. The *Cronbach Alpha* value presented in Table 3 shows that it is greater than 0.8 for themes and sub dimensions, which is considered acceptable in studies (Bujang, Omar, & Baharum, 2018).

Table 3

Cronbach's Alpha Values for Themes

		Cronbach's Alpha	
Scale	**Items**	**Baseline**	**Endline**
Action Research Ability	6	0.952	0.930
Action Research Belief	19	0.809	0.829
Mentoring Skills	13	0.982	0.882
Reflection	13	0.952	0.911
ICT Belief	9	0.822	0.886
Collaboration	16	0.951	0.965

Paired sample t-tests were conducted for the themes Ability and Belief of Action Research, Mentoring, Reflection and Collaboration in which the data was normally distributed. However, data collected on ICT and Teaching and learning, specifically, on the beliefs of use of technology were not normality distributed (Table 4), hence, was analysed based on the mean values.

Table 4

Test of Normality (Shapiro - Wilk)

Difference of Scales	**W**	**p value**
Action Research Familiarity	0.894	0.110
Action Research Ability	0.932	0.364
Action Research Belief	0.937	0.415
Mentoring Skills	0.880	0.70
Reflection	0.974	0.934
ICT Belief	0.772	0.003
Collaboration	0.962	0.777

Action research familiarity was measured on a 5 point likert scale *(1=Not at all, 2=To a small extent, 3= To a moderate extent, 4=To a great extent, 5=To a very great extent),* whereas action research ability was measured on a 4 point scale *(1=No ability, 2=Low ability, 3= Moderate ability, 4=High ability).* Similarly mentoring skills were also measured using a similar 4 point scale *(1=New to me, 2=Low ability, 3= Moderate ability, 4=High ability)* as action research ability. Additionally, belief on action research and use of ICT was measured using a 5 point scale *(1=Strongly disagree, 2=Disagree, 3= Neutral, 4=Agree, 5=Strongly Agree)*

Lasty, data collected on the frequency of engagement in reflective and collaborative activities for PD, a 5 point scale was used *(1=Never, 2=Once a month, 3= A few times a month, 4=A few times a week, 5=Daily).*

SECTION III: FINDINGS

This section presents the findings from the analysis of baseline and endline surveys and interviews. Each theme starts with qualitative findings and is then followed by quantitative findings, except in the theme MATPD.

MATPD

Understanding of MATPD

The fellows of Maldives expressed their knowledge, expectations and responsibilities pertaining to the fellowship program. There was an understanding amongst the fellows that the fellowship will help address the PD of teacher educators/teachers through various strategies adopted. Some of the fellows also emphasized on how action research will help improve their teaching practice in different areas. The fellows had certain expectations from the project which they articulated during the course of the interview such as: learning and constructing new knowledge, how to engage better with teachers to help improve their teaching practice, acquiring skills to carry out action research, observing classes and giving constructive feedback to the teachers etc. In addition, they spoke about their role and responsibilities, which included carrying out AR with the teachers, completing the courses and other aspects of the fellowship. The field mentors seemed to be clear with their role. They were well aware that they were to mentor and guide the fellows in every step of their research from the beginning till the end.

Fellows Role in MATPD

Findings from the baseline interviews revealed that prior to taking up the fellowship training, the fellows were clear about their roles. They understood that as part of the fellowship they were required to conduct AR upon completion of the training program. For example as stated by fellow 6 *"my role, I believe I will be conducting action research and while working in the research"* . Similarly, *"do a small research and share it with, I mean the country" (F10).* Hence, fellows were well informed about the role and believed that this fellowship is a good opportunity for them to share knowledge, and act as a facilitator for other teachers in developing their knowledge, skills, pedagogical content in a beneficial way. Thus, the fellowship was viewed as an important aspect for PD.

> *"I understand that we have to undergo a lot of training in this module and after that we have to do actual research; we have to involve teachers from different schools; and we have to conduct it online… I can impart this information and skills to teachers who are working with me as well" - (F9)*

"… I would be training them. I would be passing on all the knowledge that I have learned and I will be collaborating with them. The training part will include all the knowledge and information that I gathered for them. I will be sharing it with them,…So, as a fellow I will try to instil in them the motivation to continue to do action research in their practice, and also to disseminate what they learn to other teachers" - (F1)

Fellows' views and perception on the fellowship and their roles in the MATP project were reviewed again upon competition of the fellowship. The interviews revealed that fellows' understanding of their roles in the MATPD project had evolved. Their understanding varied from, work as a researcher, providing support, collecting important data, conducting workshops to understanding the context in the schools. The following examples illustrates the same:

"My role was to work as a researcher basically as a mentor and go into the education field and get that data and write an action research. So basically be a source that could actually go and gather the educational data and identify the problem, and as a researcher, try to find out the solutions for that." - (F10)

"My role is to provide support or help to the teachers to improve their performance in their teaching field and also help my students to learn and create a more inclusive environment in the schools" - (F14)

"My role regarding the many People project was I guess to understand the local context in the school environment, find a gap regarding the interest area…" - (F17)

Professional Development Experience

Qualitative Findings

Findings from the baseline survey revealed that fellows were in consensus that PD plays a significant role in teaching and learning, especially given the fast changing pace of the content in today's world. The following excerpts from interviewees highlight the importance of PD:

> *"PD is very significant for teaching and learning especially, for teachers. Because the content, even considering the content knowledge of the subject it's been changing daily like, it keep on changing so, we just had to update the content knowledge is one basic thing."* - *(F14)*

> *"It is very important, because I see that knowledge, practice and technology, everything is changing very fast in the education system, things are changing very fast. Our teachers they have to be familiar with the changes that is coming into knowledge, that is coming into technology, that is coming into skills the mode of delivery and everything, pedagogy"* - *(F11)*

> *"the role of being a mentor and then I had to take the role of the mentor so that I can motivate them to be in the session and also to implement this project inside the classroom"- (F4)*

In line with this thought, after the fellowship, fellows mentioned that new concepts they learnt consisted of action research, mentoring, and use of ICT in classrooms. The following are some examples:

> *"the main takeaway from for me from this workshop is to use action research because through action research in action research project, we can develop teachers professional as opposed to what we have been doing earlier, in, in service training"* - *(F13)*

> *"The most interesting thing I would say is, like, about technology implementing technology in the classrooms, like in a more practical perspective … the role of being a mentor and then I had to take the role of the mentor so that I can motivate them to be in the session and also to implement this project inside the classroom"- (F4)*

During the baseline interviews, fellows felt that as part of their PD teachers should learn how to communicate effectively, deal with problems well, and coach students effectively using the skills and competencies required to be an effective teacher educator. There were suggestions that PD should not only focus on knowledge and content but also on how to deliver it in a better way, apt for the 21st century.

> *"So it's very important that we develop ourselves. And it keeps evolving, so we have to keep up with that pace" - (F3)*

> *"I think if good mentoring and things is there, then the teachers can be trained better" - (F4)*

Interestingly, findings from endline interviews, fellows' opinion on the key skills and competencies required to be an effective teacher educator revealed that teachers need to be adaptive to changes in environment, knowledgeable, be able to communicate effectively, be a good listener, develop critical thinking and be willing to help and share information. A fellow had highlighted the use of relevant skills such as, *"other personal skills are involved, critical thinking skills are involved and being able to help and, you know, be empathetic towards the teachers" (F13)*

> *"needs to be really good in communication so that the aspect of the concepts can be delivered to the students as per, like different students and different cohorts are different. So the delivery method also has to be in the, how you communicate the concept with the students also has to be, you know, kind of like tailored to the specific needs of the students. So, the flexibility, adaptability and also resilience". (F1)*

During the baseline survey fellows mentioned that the most valuable forms of PD activities include creating a learning community within an institute.

> *"…the same time when we are able to identify the common issues that we find that all teachers are facing so for that we plan PDs as well. So, I've been able to conduct a few PDs in my school as well" - (F3)*

By the end of the fellowship, fellows' opinion on how teachers learn through PD activities slightly varied such that they believed that teachers learn from experience, by doing, by reflecting, through workshops and through learning communities within the schools. For instance,

> *"Teachers learn mostly by experience I would say because here, most of the teachers, I'm being quite frank here, they go to the courses and training just to get some certificate. That's what I have observed throughout the years. But teachers learn a lot through experience, through trial and error" - (F10)*

> *"I think teachers learn by doing. By reflecting when someone… some expert tries to go into their classroom or teaching and learning environment and then they sit with them, mentor them very closely and work really, very collaboratively with the teachers and assist them or guide them in a very, very closely" - (F7)*

Fellows' compared the new and different learning experiences during and after the fellowship. What stood out was the fellows' perception of PD as a one off activity and that it could also be conducted as a continuous activity. Additionally, fellows also highlighted their experiences with mentoring and their attitude towards mentoring and collaborative work.

> *"From the teacher professional programs, which was conducted from this. But I noticed there was a teacher, PD was offered in a continuous manner. The same thing is conducted here. However, over here, its policy level of 15 hours is a requirement. However, over there, the difference, which I noticed is continuously, they are offering.."* - *(F7)*

> *"These are really good for us as teachers. Because mainly the thing is we do have PD programs and all. But a lot of times, they are not individualized or catering to our needs. So when we get support through these interactions, that is really helpful"* - *(F3)*

Fellows stated that time was a challenging factor in this fellowship. They meant the time required for the fellows to conduct the action research and also to be committed to the fellowship was challenging as some of the fellows were setting foot into the school after a long time, hence, they described the process as challenging. Lack of competence was highlighted by one of the Fellows, *"...doing the research, that is actually something that I need more training or more experience, this is the first time I have done such kind of research. So that is the most challenging part…"* (F12)

The fellowship consisted of teachers, teacher educators and school principals. The findings on how the fellows identify themselves varied from teachers to teacher educators. However, what was interesting was that some fellows believed that they can become a mentor given their experience and knowledge.

> *"..I can help teachers. I can be a mentor because I have professional experience and I have gone through some of the professional programs. So yeah, I can work as a teacher educator"* - *(F14)*

> *"I feel that I am a teacher educator, I can and then how they proceed after they have been given the lessons. What I see from them even after we send them for their TP and I think I am a teacher educator"* - *(F4)*

Findings on the fellows' understanding of the connections between the different themes /ideas in the MATPD project revealed that the fellows were able to make several connections with what they have learnt in the fellowship. For example, use of ICT in the classroom, writing skills, action research, mentoring and reflection are reflected in the following comments.

"...incorporating ICT in the classroom. In this 21st century, ICT skills are quite important and students learn better if you use ICT". - (F14)

"...it emphasizes two major things which weren't very much touched upon before; that is coaching and mentoring, and action research" - (F13)

Likewise, fellows' thoughts and opinions about using blended approaches for effective TPD in their country context was positive. A fellow said that *"...I think the blended mode. I think if we would have just like, you know, like sticked with one of the modes, it will be pretty different"* (F14)

Quantitative Findings

Findings on the baseline survey on the PD experience revealed that the types of TPD activities the research fellows were involved with ranged from individually participating workshops, seminars, conferences to collaborative research and participation in PD exchange opportunities. Majority of the fellows (n=10) had participated in courses and workshops on education-related areas, while few (n=2) were participating as a resource person or designing the programme . Twelve of the fellows had also participated in educational conferences and seminars. A good proportion were also involved in the organizing and coordination of such conferences and seminars. A majority of the fellows (n=9) were also involved with the observation visits to other schools and in the physical meet-up of a network of teachers. 11 of the fellows were notably involved in observation visits to other teacher educator institutes.

Considering the fellows' involvement in TPD research activities, although a significant proportion (n=9) were involved in collaborative individual research, it is notable that six fellows did not participate in individual/collaborative research. However, when it comes to action research conducted on an individual or collaboratively, less than half (n=7) had participated in the action research activities. A significant proportion (n=6) had not participated in any form of action research.

It is also noteworthy that only four fellows had participated in mentoring, peer observation and coaching related TPD activities. Activities related to reading academic papers, journals, and evidence based papers were undertaken by (n=4), while a similar percentage (n=3) reported that they did not undertake such reading activities.

However, the majority of the fellows (n=12) reports that they engage in informal dialogue with peers on how to improve teaching. The same number of fellows (n=12) had reported that they had participated in PD international exchange opportunities. *(See Table E1)*

Action Research

Qualitative Findings

Data was collected at two stages of the MATPD project. Fellows' understanding of action research was gathered prior to the SATE fellowship as well as after the fellowship. The findings represent that of the Fellows and mentors at both stages including data from interviews and survey forms.

Understanding of Action Research

Even prior to the fellowship participants had expressed their understanding of action research as a familiar concept to them. While they accepted that they had knowledge and skills of Action research to a moderate extent before the training and had engaged in doing action research to some extent, they expressed that it was the first time that they got to experience Action research under the guidance of two different mentors.

Lack of research competencies in the fellows was identified from the initial interviews, however, the training enabled them to apply what they had learnt in real classroom settings. The Fellows admitted that the module on action research has given them the opportunity to learn the process of action research from the beginning to the end. They also felt that action research was an important part of the teaching learning process and even teacher educators need to engage in action research on their own practices.

> *"how to carry out that action research successfully, which is to, from the beginning to the end. Starting from the research question literature, how to go into the field. What are the different methodologies that we can use in Maldivian schools, how to work with the teachers, and how to collect datas [sic], various ways of collecting datas [sic], data for action research, and how to compile it, and make it into a research paper. So, basically, the most thing I would say that I have learned Is how to deal with difficult situations in the action research process"* **-** *(F10).*

Experiences of Action Research

While the MATPD project had provided the research fellows with the experience of engaging in action research, there were many aspects that worked for them as well as challenges they encountered during this experience. The fellows who had engaged in the action research had noticed significant changes in the teaching and learning process after the interventions and believed that it had met their expectations.

"The first cycle worked well, I think very well, but in the second cycle teachers were just a little bit less interested in that so it was not as effective as the second cycle. First one was very nice. I mean, like I feel satisfied in the first cycle"- (F14).

"They were so interested, I was in awe, you know, for saying, even the teacher said, I will quote "I was amazed to see students bringing comics books to classroom", you know, they were sharing the comics they had at home now they see that the teacher is using comic strips as a media, to teach them. How they can learn from this thing. So it was very interesting"- (F2).

Challenges in conducting Action Research

However, similar to what they stated as a gap in doing action research prior to the fellowship, still the limitation of time existed as a barrier for them and did not allow them to complete the second cycle of the action research as planned earlier. Although their knowledge and skills on action research had increased after the fellowship, since the interventions were practically implemented by secondary participants, this posed challenges in conducting the action research in the way the fellows intended. The participants felt that it had been a bit challenging for the teachers who engaged to comprehend and conduct the action research. They also mentioned that there were still some areas that they could improve based on their experiences of conducting action research.

"… if I had selected all the teachers from the grade including the religious subject teachers, my findings would have been much more strengthened and I think I could have done comparative findings" - (F3).

Perspectives on Action Research

Based on the fellows' ideas and thoughts about how they would use action research in the future, they feel more positive about the benefits of action research and feel more strongly about the use of action research for solving contextual problems compared to their initial responses in interviews conducted prior to actually engaging in action research after the fellowship.

"So, in the near future, I will be involved and I will be comfortable in participating in action research. I will know the know-how of conducting. The conducting action research is, I have actively participated and got the opportunity to participate in this action research. So I guess I have got a bit of confidence in conducting action research. So, I will be thinking of conducting research in future" - (F7).

" I'm very much interested in social research. So, one thing that I definitely interested in is applying community based action research, where I work with the community, to find a solution to a problem that exists in a particular community. Yes" - (F1).

Likewise, the fellows envisioned practical challenges in engaging in action research. Apart from the limitations in time mentioned in the interviews prior to the fellowship, they also perceive that there still needs to be more done on making teachers aware of the importance of action for their own PD. They strongly believe that there is a lack of culture of action research in our country and more policy based decisions need to be in place to build such a culture.

"One thing is that because society has not given action research as something, which is important. That is because the whole school for example, teachers don't find people doing it. People working on action researchers, they don't see any such culture" - (F14).

" I think that the first the one thing is like, it's not like something that is compulsory for the teachers, that is one thing now if it is not compulsory means if they don't have any, And if there is no any personal interest in that, and if they don't know anything about what is action research, what is the importance of doing research and those kinds of academic work, I think they will not do it, they are not like very familiar to it, it's one thing" - (F12).

Recommendations while Conducting Action Research

The support mechanisms suggested by fellows to make action research part of their regular practice include facilitating and supporting teachers to conduct action research. A policy level change and making action research compulsory was emphasised by fellows in their responses.

" I think there should be someone to lead this kind of thing. Like even if it's a discussion or reflective sessions, there should be someone to lead the sessions. Someone to moderate, someone who has some knowledge of what they are doing"- (F13).

"I think the schools, the management right from this schools, that should like they should have kind of maybe a policy for the teachers and maybe not like policy policy, but something like a rule or something like that in a year or in every two years, every teacher much must carry out an action research or maybe a group of teachers can collaborate and do it"- (F8)

"I think we can, we can include that as a part of PD right, as I said, kind of kind of compulsory something like that we can do now, it's one thing then another thing is instead of this kind of general workshop for PD, we can make all the schools like it is kind

of like come as a practice that like every year at least one action research from each school we can conduct" - (F12)

The fellows had gained a lot of experience in action research during their Action research process of MATPD. The fellows described how they guided the teachers to conduct their action research.

My research was about Student centered ICT integration in science teaching and learning. So I worked with science teachers. Four of the teachers were selected and with them. I was working. First I gave them information about the research and then we conducted a pre implementation interview before conducting interviews. And then training was conducted related to the action Research part of the intervention. Then they were teaching lessons of 'cell' topic. And during the time, I was observing the lessons and after that again, we discussed the feedback session was like a discussion … And for the second cycle, also, I observed the lessons. And mainly, I was working with teachers after that part collaboratively. There were sessions were taken for teachers [sic]. I was taking the sessions before the implementation of the research. That was a collaborative work the implementation process. So collaborative work because of observation, feedback and discussions were also collaborative work … I have to meet with them face to face to encourage them, and I met with them face to face and explained. I've explained about this research. They are all in it and their work in it and things like that and what is expected of them and also, I think the other part, right? Research, the word research is taken is a very huge thing, but we have to like, explain to them how classroom action research is conducted, those things, I think, help them encourage them.

It was online. And two, two sessions were taken … First, well first I explained and discussed student-centered learning and from the second Workshop We explore it because that was student-centered learning and integration of ICT in a student centered way. Then the second part was a session about the applications, that are to be used in this study. I showed them the application and then we discussed about how this can be used in the chosen topics for the study - (F6)

Quantitative Findings

A large percentage of the fellows had gained their knowledge of action research mostly through discussions with colleagues and from books, while journals were ranked as the third source. TPDs, conferences and webinars were found to be sources that were used rarely compared to the aforementioned means (Figure 2)

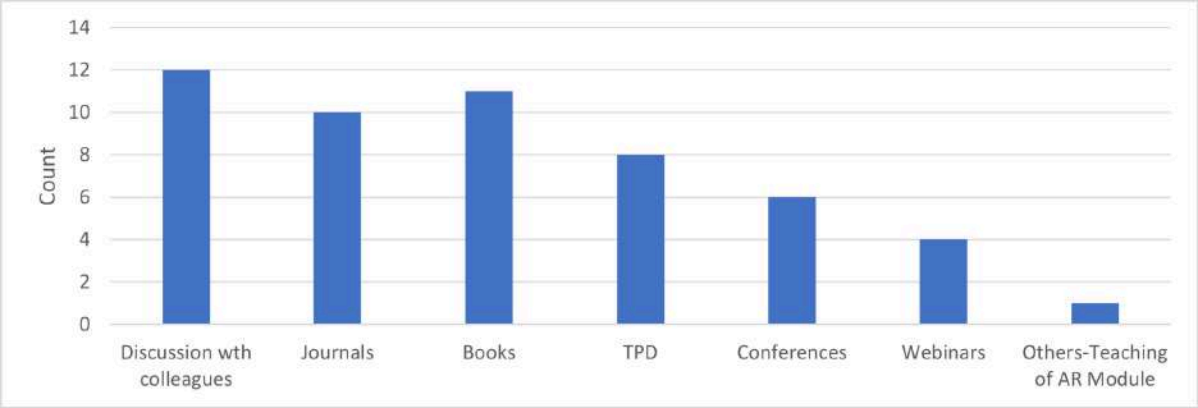


Figure 2

Sources of Information on Action Research - Baseline Study

The Fellows familiarity of action research had increased after the SATE Fellowship and it could be seen in their responses to the interviews during the baseline and endline survey (Figure 3)

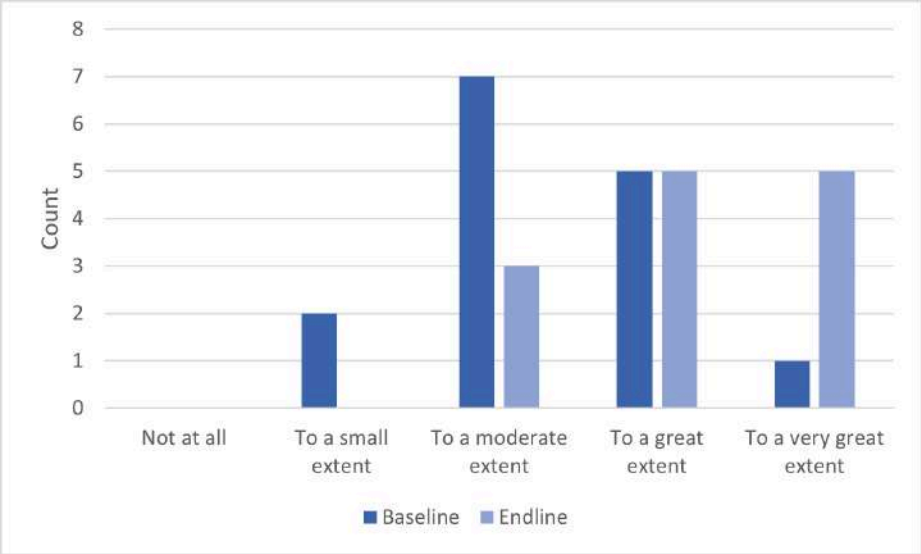


Figure 3

Fellows Familiarity of Action Research - Baseline-Endline Comparison

A paired sample t-test was performed to confirm whether there is a significant increase in action research familiarity. Results presented in table 5 show that there is a significant difference in the familiarity of action research pre fellowship (M=3.38, SD=0.77) and post fellowship (M=4.15, SD=0.80), t(12)=-2.99, P=0.011. Since the p value is less than 0.05 it is

concluded that post fellowship there is a significant increase in action research familiarity among the fellows.

Table 5

Paired Sample t-test on Action Research Familiarity

	Mean	Std. Deviation	Paired Differences		t	df	Sig. (2-tailed
			Mean	Std. Deviation			
AR Familiarity_Baseline	3.38	.768	-.769	.927	-2.99	12	.011
AR Familiarity_Endline	4.15	.801					

The experience of engaging in an action research was found to be of dire need for the participants of the SATE fellowship as the responses to the baseline survey conducted initially revealed that most of the participants do not have the experience of conducting action research either during their pre-service program or at work, although some had mentored students or teachers during action research (Figure 4).

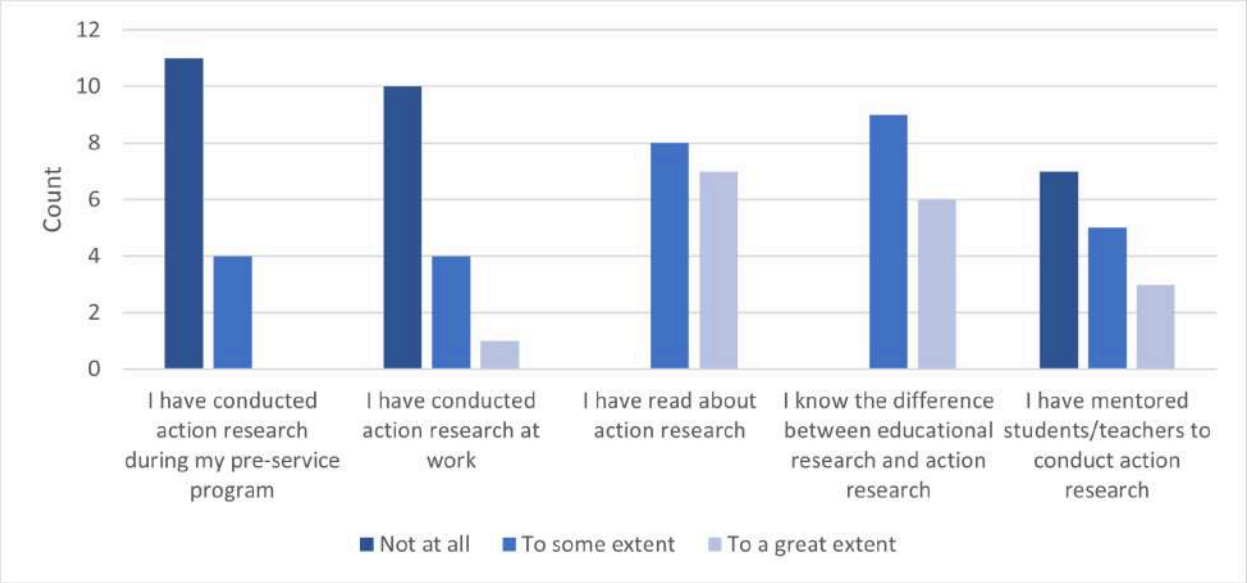


Figure 4

Fellows Experience of Action Research - Baseline Study

The challenges to conducting action research revolved around three main ideas. The facts that were most strongly agreed by participating fellows were the lack of any support or guidance in

doing action research and also the difficulty in finding time to conduct action research. This is also in line with the agreements of fellow participants regarding their lack of research competencies (Figure 5)

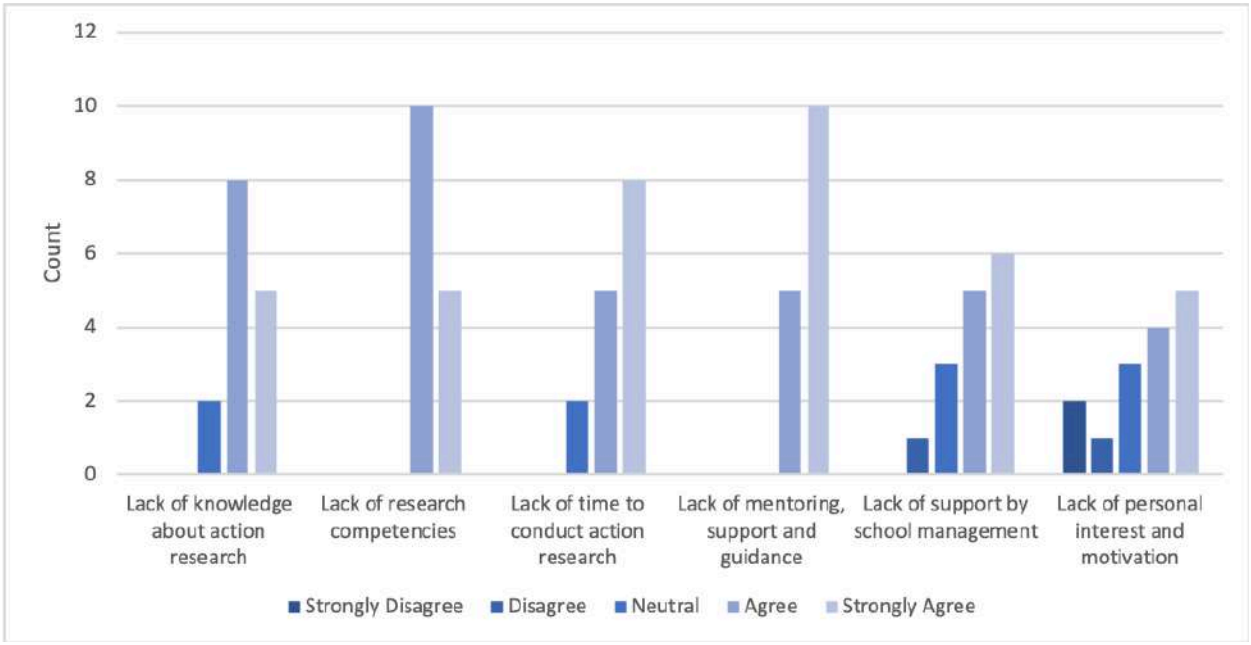


Figure 5
Challenges in Conducting Action Research - Baseline Study

There has been no significant increase in the Fellow's ability to conduct action research compared to before and after the fellowship as per the survey responses (Figure 6).

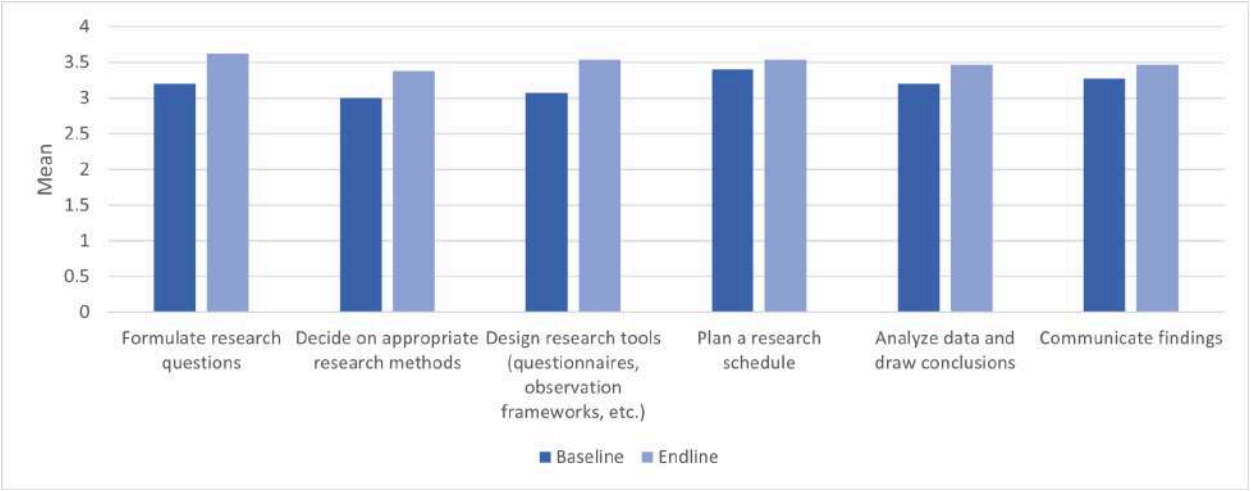


Figure 6
Fellows Ability of Action Research - Baseline-Endline Comparison

Paired sample t-test results presented in table 6 indicated that there is no significant increase in fellows ability to conduct action research from pre fellowship (M=3.25, SD=0.55) and post fellowship (M=3.50, SD=0.49), t(12)=-1.63, P=0.129. As the p value is greater than 0.05 it is concluded that that fellows ability to conduct action research did not increase during fellowship.

Table 6

Paired Sample t-test on Action Research Ability

	Mean	Std. Deviation	Paired Differences		t	df	Sig. (2-tailed
			Mean	Std. Deviation			
Ability_Baseline	3.25	.551	-.243	.538	-1.63	12	.129
Ability_Endline	3.50	.486					

Similarly, there is not much difference in fellows belief on action research post fellowship (Table F1 and F2). A paired sample t-test was conducted to examine whether there is a difference in fellows' beliefs on action research. Results presented in table 7 indicate that there is no significant difference in fellows belief towards action research from pre fellowship (M=4.29, SD=0.41) and post fellowship (M=4.34, SD=0.384), t(12)=-0.435, P=0.671. Since the p value is greater than 0.05 it is concluded during the fellowship there is no significant difference in fellows beliefs towards action research.

Table 7

Paired Sample t-test on Action Research Belief

	Mean	Std. Deviation	Paired Differences		t	df	Sig. (2-tailed
			Mean	Std. Deviation			
AR Belief_Baseline	4.29	.410	-.049	.403	-0.435	12	.671
AR Belief_Endline	4.34	.384					

Mentoring

Qualitative Findings

Understanding of Mentoring

The findings regarding the fellows' understanding of mentoring of the endline study after the SATE fellowship resulted in similar findings to that of the baseline study. Even initially, they had believed that it was similar to facilitating and guiding and were under the impression that it was guidance given to an individual by a person superior to them in some way. However, their understanding of mentoring developed to a further level after the fellowship by experiencing the collaborative nature of mentoring which they had to experience during the fellowship. fellows stated that, '*Working in a really collaborative and sharing the experiences and good practices with each other, in a continuous manner' (F7) and 'Mentoring is giving actually support…. Through the discussions, they come up with the solution' (F5).*

> *"Mentoring is like as I said it's kind of like a two-way street. It's not a one-way street. As I said, it's important to understand each other and to understand each other the mentor and teacher educator need to work with the teachers to actually gain insight on what actually the teacher needs and how they need the support as well" - (F1).*

The fellows were very clear about the difference between mentoring and monitoring even before the fellowship training.

Although all the fellows had the opportunity of being a mentee in their pre-service teacher education and also in their workplaces, it was evident that not all had had the experience of being in the role of a mentor. The action research in the fellowship provided the opportunity for fellows to experience the roles of being both a mentor and a mentee. They were in the role of a mentor through their working with teachers in schools and as a mentee with their interactions with their Academic Mentors and Field Mentors.

It was believed that Mentoring, if used for the purpose of PD, would benefit the Teacher educators as well. This was an idea brought up in their responses before the Fellowship training. A fellow commented that '*A teacher educator can be mentor, when they become a mentor they would be learning about the topic and they would gain the knowledge and also provide this information' (F14).*

> *"It will give a lot of insights and experience actually for the teacher educators because teacher educators also will be working with the teacher and he or she will be collecting real data or experience from the field. So that will be very important for teacher educators a lot of new data's new experiences will be, can be gathered from the*

teachers" - (F12).

Using Mentoring in the Future

Following the SATE fellowship, the fellows are looking forward to using their learning on mentoring for the PD of teachers. Prior to the fellowship, PD of teachers were taken as one-off sessions for a few hours which did not sustain the skills or knowledge gained from PDs. The fellows feel it is very important for mentoring to continue until teachers are more confident in applying what they have learnt. They stated their future plans of using mentoring as *'… a small role of mentorship mentoring my teachers to do better'. (F1).* Other fellows also had plans like *' I will use it for the overall improvement of my school. That's what I have planned and it's what I'm doing now, after this project' (F12).*

> *"I think it's perhaps the only alternative for now because what they have been doing in school i often gave these invitations to conduct PD sessions in different schools. So they have these PD thing and what I find is that for one of the sessions, I took one, teachers have a lot of questions to ask and then they are also expecting a lot of guidance from me and also citations for their lessons and so on. But I was given like four hours to conduct the workshop. So after the four hours, my connection with them would be over so it's like one of connection but rather than if we had a mentorship or as a mentor. If it can be like extended over some period, if they had someone who has authority on a particular topic and who is in a position to guide them, then I think they would be more willing to implement what they learned in PD and also they would find it more useful and it would be more sustainable than what they are doing now" - (F13).*

In their responses about using the skills and knowledge from SATE fellowship for mentoring. It was found that mentoring not only improves pedagogy but also enhances psychological skills. A fellow had stated that '*Just maybe even though teachers being adults, they also need guidance and things. So it can help them. Like, to make some decisions if they are not very sure of what they are going to do' (F8).* They had not mentioned using mentoring in any future action research they may conduct, though they did mentor in the fellowship's action research.

> *"Yeah, if we can build close relationships with them, then they will be motivated to continue to work with us. and willingly, they will share all kinds of problems that they are facing. And when they share the problems they are facing, …" - (F4)*

Skills Learned about Mentoring

Initially before the training, mentoring was seen as a very new concept in the Maldives by the fellows. Nevertheless, they gained a lot of skills from the fellowship. Communication skills and listening skills in particular are significant learnings from the fellowship compared to baseline

interviews.

> *"To do this. for example, Be good listeners, willing to help them and things like that. so it's different from monitoring. is just, like, Supervising their work. The guidance and feedback part is also there, but didn't mean like this. there's a relationship developed between the teachers and trust is built, …" - (F6).*

> *I may stop and say, but through this mentoring one, I think I have become a better listener. You know, in terms of waiting until the person finishes what he or she wants to say, I may interrupt, but now the skill of listening. I think I'm more confident. I have improved, in terms of listening and trying to understand. And listen, listening, of course. because I interrupt, I just maybe break and then say something. But now I find myself, more a good listener, more of a good listener - (F2).*

Attitudes Towards Mentoring

The fellows had a positive attitude towards the use of a blended mode of mentoring in the Maldivian context. This was based on their experiences during the fellowship. A fellow said that *'It was useful, because here in the blended mode the teacher would be getting the chance to work in their own time and also with the mentor' (F14).*

> *"Most of the time I had to travel during this mentorship program, I had to travel, it was really difficult due to the busy schedule in the, but if it is faced to face it, it would have been better, I guess, but I think hybrid mode is better than only depending on face to face or depending on online" - (F7).*

> *"Yeah, I think the blended mode helped because you can actually use it and complete it in your own flexible timing" - (F1)*

> *"The blended mode, It wasn't very easy. I think we, we don't really like online a lot, especially after the Covid, can be kind of fed up with the online world. Now, No, I think it could have been much more effective if we did it. If we were able to do it in person instead of blended mode, at the same time, doing it in the blended mode, made it more flexible for us" - (F3).*

Challenges Faced in Mentoring

The challenges highlighted by the fellows include the confusion created due to lack of coordination between mentors. Fellows stated this as *'What I observed was there was less coordination between both because when I asked from one mentor, this was taught by the other mentor'. (F7).*

Time constraints of the mentors in providing feedback were also mentioned by a few fellows *'The workload and especially to communicate with the mentor, my academic mentor, she's actually quite busy'. (F14)*.

Almost all the fellows faced no issues in mentoring by belonging to a particular gender except for one who had issues in her confidence level.

> *"I think yes because I don't know, when I worked in the school, I always hesitate when I'm interacting with the male teachers, especially the seniors. Oh, like the ones at the same level as me who were also leading teachers, but they were more experienced. So I kind of like sometimes even rehearse what I'm going to say to them in my mind before even approaching them when I have to and that's something you know. So like I think in our society or even within the school system, it is perceived that women are supposed to or like we are under this obligation that we have to work more and work more efficiently. And the men, they always find the easy way out. so at the end it is again, like even though it's a task assigned for a man but still towards the end it's again reciprocated in the man the woman So, I think yes. It ha". - (F3).*

Experiences in Mentoring

In terms of fellows' experiences with the Academic Mentors, they were all happy except for one Fellow who had trouble getting help from the Academic Mentor. Different fellows stated that they were given help in various aspects, including the content of the topic being explored in the action research, pedagogical support, action research methods and also by giving feedback for the action research report a couple of times. As such, a fellow mentioned *'My academic mentor told to include focus group interviews, both before the intervention to identify the gaps … after I presented' - (F7).*

Providing resources was also mentioned by one Fellow.

> *"I was discussing with the academic mentor, but the topic and the applications to choose and that was critical because first I was, Like more Focused at my research for Any topic like science but he gave this suggestion to focus on a specific topic"- (F6)*

> *"Academic mentor. Yeah, she was available. She as I said, she provided with resources and medi …. So let's say throughout this project, especially the implementation part developing the implementation, intervention, developing the resources, identifying all this, there was a frequent communications with the academic mentor as well. In terms of developing the rubric, there was back and forth email communications and via telegram also we were communicating. And of course, with the field mentor by phone, by Google meet. That was also done then through Viber as well. So yeah, it was frequent during the*

implementation process or in the planning stage. And then afterwards, when I was compiling the report"- (F2)

"In terms of coming up with PD tasks, the guidance she gave was very useful because she pointed out to me some useful website from which I could draw examples and so on for this TMA model. So I think that really helped me for designing my PD materials. In terms of writing also she did point out some of the aspects where I needed more evidence in my own writing. In the sense you need more evidence form literature to support this part. So that kind of suggestions were helpful " - (F13)

The fellows were more comfortable with the support received from their Field mentors as this happened more often and also got comments relating to the local context. Also more support relating to the implementation process was provided by the Field Mentors in most cases as stated by a fellow that *'.. Field mentors are more like helping us in the field work, right? But they were also very helpful actually. Even they gave a good feedback in the report writing as well'. (F8)* and *'I will say to two to three times I communicated with academic mentor for the project by my field mentor used to call me like every week and get update from me'. (F14).*

"And the other is because one of them is from Maldivian contexts, she was able to understand my situation. And where I found it difficult to explain to my academic mentor, she would intervene, and then on its behalf, to help. And the other thing, it was that my academic mentor was also really respectful towards the field mentor. So once she gives her side of the feedback, she would also ask comments from field mentor. So I think because both of them met me together for quite some time, and they virtually discussed. So I think that that way, it was really effective" - (F13)

"So with the field mentor I have brought some modifications to the implementation process, but in the preparation of the proposal and then the preparation of the action research, the report for that I have got the information and help from academic mentors" - (F12)

"I think the field mentors we work, were very generic, of course, because they are the field mentor. So they won't be commenting on the technical aspects. But It also helped me to make my research report more organized. And like sometimes like we may not be able to notice things on our own, but having a critical eye on it, it could be very useful" - (F3)

Mentoring during the Action Research process

The fellows' roles in the action research required giving them support in all different ways to ensure that it was implemented successfully from the time they conducted the PD for the

teachers initially.

> *"If they had any queries I would answer. I mean I would try to give them advice and encouragement and try to help them. then also, I think the sessions were also useful to them. And I suggest them but they were able to do it in the class but for the next class in order to overcome that problem like they can Schedule That lesson And then go before the class and then check if the applications are working and provide the students give the students the link, so they can directly open the link and then it will save time. Like this, suggestions like that have been given and also how to incorporate application in their lessons" - (F6)*

> *"So it was kind of, the teachers were leading, in a way and I was there just to guide them and just to give ideas for them, but they themselves identified, how this will be carried out. For in terms, let's say in terms of post, pre-tests. I ask them which, they should give a pretest and they, they were thinking of a topic, what would be a good topic for them to come up with a piece of writing that is creative. So they went on, they identified a topic and then the pretest was done and it was marked also in the normal traditional way, so that was solely for them. But it, when it came for the intervention with the comic strips and all that so there was sharing of ideas and my ideas as well. So that collaboration was there and also Al'hamdulillah, these teachers, they were very helpful, they were very willing to learn, you know" - (F2)*

> *"I observed, I did have some chat with one I observed before that, I first had an initial focus group discussion. And then we had PD and then once teachers finished implementing, teaching the children students TMA, I did a reflective session. And then in the middle of the cycle, before I began the second cycle, there was a reflective session and towards the end, I think, there are like four to five times face to face discussion with all teachers. And then we had this viber. did check on their lesson plans when they ask for help. And then also, I asked them to select student writings to show me so that I could draw some excerpts from my report, based on what they suggested. So I asked them to choose weak students, and then to show the improvement. And sometimes, you know, in those kinds of texts and contexts, they would give me a lot of texts. And they would ask me to help them choose, I mean, text respond to different levels." - (F13)*

> *"We did a lot like every week I used to call them. Or, I go for observation and then we talked about how the lessons were going on and What were there actually, What were the difficulties They were facing while conducting the sessions. So it went very well. And we, I also had separate Viber group for them. So if there are any issues we could always communicate. So I would say monthly we did and also online and offline. We did communicate" - (F5)*

"So like, whatever the support they were asking, especially for them, it was difficult like generate some Ideas like creative ideas. So, in that regard and for some of the problems also they were not able to have a solution for that. So, we, I have worked with the teachers discussed with the teachers and through that process, we came up with solutions and we came up with different a creative" - (F12)

"Like even when Teacher directly asked me like how how she could go about it in a way that won't be too critical or too contradictory even. So I just shared what I would do in such a situation. I didn't want to ask the teachers to do this to do that. I just gave them ways. People usually do it or how I have done it. So they had that freedom to choose which way they were going to use or which would be the most effective one for this situation" - (F3)

Mode of Mentoring in the Maldives

Looking at the fellows' views on what will work for mentoring in the Maldivian context, they were convinced that a blended mode of mentoring would be a very convenient mode for the Maldives. A fellow stated that '*Blended mode is I mean is the thing now so because since we are that is the way it will work also. So it's fine. Definitely face to face might be the best part'. (F15).* There were also suggestions on what levels of mentoring is required for the schools such as '*… if they are actually facilitated with good academic mentors and field mentors, I think the teacher, it will be a great help for the teachers to go forward' (F10).*

"… based on my experience, I guess in the mentoring model that will work in Maldives is grade level mentoring. A grade level. For example, if there are six teachers in the newly appointed teacher is, comes into the school or the grade, always assign the newly appointed teacher to a teacher, who is more experienced. the mentorship can be Assigned formally by the leading teacher and then I think it can be monitored by the leading teacher regularly, through classroom observations, I think that will be more practical to the Maldivian context" - (F7)

"I think the lead, the mentoring model even right now is working because every grade has a leading teacher and they have their leading teacher on group discussions every week. That's one mentoring that's actually working, but then on top of that, I don't know. I'm not very familiar with how it is done, but with that, I think like this leading teacher does, they do, classroom observations to provide support for the teachers as well. So the current mentor problem, I think it kind of works" - (F1)

"In Maldivian schools, we have leading teachers and they there are many teachers under under the leading teachers. But now it is kind of like a formal, formal process. We are having in the school. But I think leading teachers can be a mentor and some of the

experienced or senior teachers can be men.. Can be a mentor for the junior teachers. So that model might work. In the Maldivian context, I think"- (F12)

Quantitative analysis

Prior to the fellowship, most of the fellows had a good understanding of mentoring, but in terms of experience, some fellows stated that they had not had the experience of being a mentee (n=5) and some had no experience of being a mentor at all (n=6) (Figure7).

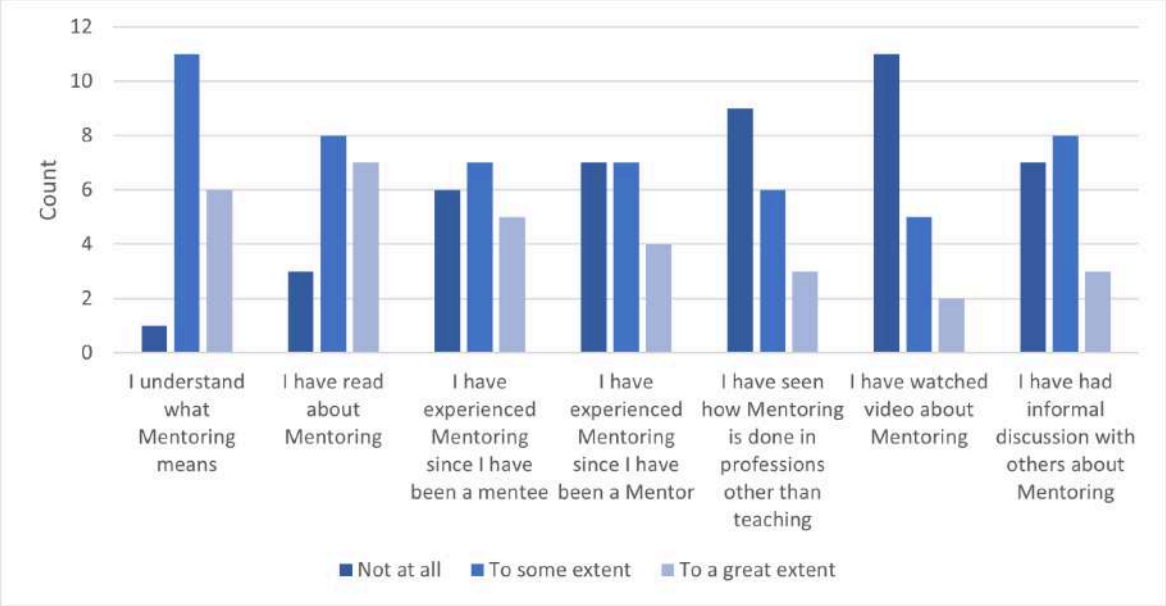


Figure 7
Understanding of Mentoring - Baseline Study

From the baseline survey, it is evident that fellows believed themselves to be more competent in mentoring in terms of most of the skills. Their understanding and the relevant sources for the information are stated in Figure 7. However, even after the SATE fellowship, for skills such as being able to encourage and motivate the mentee, willing to put aside their own beliefs and prejudices while mentoring, their ability as mentors to observe and reflect on teaching practices, introducing timelines for action research projects and help to address the queries and worries of the mentee, there was only one Fellow who claimed to have low ability in these skills.

Findings of the endline survey conducted post fellowship shows that there is a slight increase in the skills and abilities of mentoring (See Table G1 and G2). To further confirm the significance of this increase a paired sample t-test was performed.

The paired sample t-test result presented in table 8 indicates that there is a significant difference in fellows skills and abilities from pre fellowship (M=2.75, SD=0.73) to post fellowship (M=3.44, SD=0.37), t(12)=-3.56, P=0.004. Since the p value is greater than 0.05 it is concluded that during the fellowship fellows mentoring skills and abilities have increased.

Table 8

Paired sample t-test on Mentoring Skills

	Mean	Std. Deviation	Paired Differences		t	df	Sig. (2-tailed)
			Mean	Std. Deviation			
Collaboration_Endline	2.75	.733	-.692	.702	-3.56	12	.004
Collaboration_Baseline	3.44	.365					

Reflection

Qualitative Findings

Understanding of Reflection

The baseline interview focused on the understanding of the fellows' perspective on the role and importance of reflection in one's own PD. The fellows shared their experiences on the kind of reflective practices that they have engaged in. In addition to this, in the endline interview fellows were asked about their experiences of reflection in their action research..

In the baseline interview, one of the fellows from an outer island (F13) described reflection as *"To be vigilant of our own, you know, to be critical of our own practice in order to improve and not fall into the trap of being complacent to think that there are no issues….".* In general, all participants defined reflection as an activity to think back on their actions and identify what has been done wrong or what are the issues and how it could be improved for the next time. A fellow (F14) who is a school teacher defined reflection as *"...thinking about why that particular thing happened in that particular way or how that can be improved or what could have done to make it better…" - (F14)*

Reflection for Professional Development

Reflection was found to be an extremely crucial component of PD. It was found from the baseline interview that fellows who are teachers and teacher educators mostly reflect on improving lesson planning, teaching strategies, student feedback, and classroom engagement and discussions. Afterwards, in each lesson, they reflect on whether their teaching methods helped students to understand the lesson, whether their lesson planning had worked, and if not what aspects needed to be improved for the next class. Additionally, not only do they reflect on what needs improvement but also reflect on methods that worked and aspects they performed well, so they could continue it. A fellow (F11) from an outer island who is a school principal explained the importance of reflection as *"...if I see an improvement in student understanding I will know that 'okay, this is a better way to explain that' so I can change the methodology of teaching so, it's very important."* Additionally, another fellow (F3) stated *"It is very important. We always neglect this step actually, we always try to conduct the lesson but we forget that the reflection part is also a part of the lesson."*

It was found from the baseline interview that participants reflect by writing down the points, sometimes on their phones as well. Other modes of reflection mentioned by fellows include evaluating their work during PD sessions, critically judging their performances based on

feedback provided by students after class and sometimes simply thinking back on their performances.

> *"I go through all the feedback that is given to me by my students for every lesson and they give a score as well …. as a teacher, I reflect, I judge myself. What can I do to ensure that this is done better?" - (F5)*

Most of the fellows mentioned that they practise reflection after every lesson, at least they try to reflect most of the time. On the contrary, few of the fellows reflect rarely or do not get the chance to reflect often, even if they want to, due to time constraints and overload of their work. Regarding this, a fellow said "*Rarely, not much. Since we are busy with work and since we are in a very busy schedule sometimes we forget to do a reflective work"- (F14)*

> *"So, actually, we don't used to do it in a very formal way in Maldives because we don't have that practice here in Maldives but we do it informally so after every lesson we actually – not after every lesson but after many lessons we think about ways to improve" - (F9)*

> *"very very less, because we are always on the pressure, even now I'm under pressure, because we don't have much time. So that the thing is that we don't. We are on a busy schedule and we don't get a time to reflect" - (F13)*

In the endline interview, fellows were asked about their experience of reflection on different components of fellowship and how it has helped them. Fellows had mainly reflected on the face-to-face workshops attended in Mumbai, India, and the different phases of action research they conducted. During these action research fellows mentioned that they had reflected on the tools they used, data collected, and how to manage and implement two cycles. Through reflections, they were able to identify the things they could have done differently and this has actually benefited and helped them in the process of action research.

Further, two of the fellows mentioned:

> *"…so those things were quite good and I still like As I said, ICT sessions, the mentoring sessions, the reflection sessions. I do reflect on those and try to grasp whatever I can from those into My into my working, implement those into my working places."- (F15)*

> *"when we attended the workshops, by like, in India, even on mentoring and we went through the course, and so I was able to reflect a lot on my previous practice and there were like, so many things, I could have done better actually, if I knew about mentoring" - (F3)*

As part of the action research fellows had reflection sessions with teachers as well. This is mostly to understand whether teachers knew how to conduct the interventions. Additionally, a fellow mentioned that switching to daily reflection with teachers instead of reflection meetings at the end of each cycle has helped both the teachers and the fellow.

Quantitative Findings

From the baseline survey, it is evident that there are certain reflective activities that most fellows never engage in. For example, many fellows have never analyzed video recordings of lessons to improve teaching practice as a teacher educator (n=11), nor visited lessons of peers/colleagues to learn from them (n=9) and nor asked peers/colleagues to observe lessons to get feedback on teaching (n=11) and neither carried out small projects into possible causes and solutions when a problem arises (n=8). On the other hand, reflective activities most fellows engage in daily include reflecting on lessons after class (n=7), analyzing problems thoroughly before choosing a solution (n=4) and studying students' artefacts to understand how an approach has worked (n=6). (See Table H1)

Findings of the endline survey post-fellowship showed that there was a slight increase in the frequency of engagement in all the reflective activities (See Table H2). To further confirm the significance of this increase a paired sample t-test was performed. Results presented in table 9 show that there is a significant difference in the frequency of engagement in reflective practices, pre-fellowship (M=2.64, SD=1.06) and post-fellowship (M=3.31, SD=0.80), t(12)=2.55, P=0.026. Since the p value is less than 0.05 it is concluded that post-fellowship there has been a significant increase in the frequency of engagement in reflective activities.

Table 9

Paired Sample t-test on Reflective Activities

	Mean	Std. Deviation	Paired Differences		t	df	Sig. (2-tailed)
			Mean	Std. Deviation			
Reflection_Endline	3.31	.797	.669	.946	2.55	12	.026
Reflection_Baseline	2.64	1.062					

Social Learning

Qualitative Findings

This section explores how the fellows engaged with and experienced PLCs. An analysis of the different group types, modes of operation, and discussion topics is presented in this section, highlighting the value of PLCs in professional advancement. Nevertheless, it acknowledges the challenges faced by participants.

Formal and Informal Professional Learning Communities

According to baseline interview data, fellows belong to formal PLCs, informal PLCs and some belong to both formal informal PLCs. Some examples of formal PLCs fellows engage in include local and international teacher/lecturer groups, parent groups, and subject expert groups. Informal PLCs are limited to local members, but they are not limited to the fellows' organisations. Most informal PLCs have members dispersed all over the country. According to one of the fellows, *(F12), 'I am currently working with a group of lecturers from Maldives National University and Islamic University'.* Another fellow (F3) who is a leading teacher also mentioned that *'I belong to teacher blogs, so we have a community there'.* They also collaborate online as a fellow *(F10)* stated *' national subject teacher forums, we meet online'*

The interviews revealed that memberships in PLC depended on the job profile of the participants. The fellows who work more closely with schools are mainly involved with subject-specific teacher/teacher-educator groups and theme-specific teacher/teacher educator groups. The Fellows are actively engaged in capacity building and support groups where best practices are being shared and issues related to teaching and learning are being addressed. Regarding capacity building activities one fellow mentioned that "*NIE started discussion forums, one teacher from each school is selected and the discussions are around the best practices, challenges they face and how to overcome it".*

The fellows indicated that PLC group discussions and topics are centred on specific subjects. Specifically, discussions focus on new curricula, particular themes, or topics that the group members mutually agree upon. These groups typically don't have a set schedule or timeline for meetings and other activities; they convene as needed. The subject-specific formal PLCs proved highly beneficial for the fellows and facilitated their professional growth, as these groups delved into relevant subject-related topics and concerns. However, some fellows noted that PLCs focused on administrative and logistical matters to address teaching and classroom challenges faced by educators. Thus, from their perspective, group participation broadened their perspectives and facilitated new learning. Most of these discussions take place asynchronously on virtual platforms.

The fellows reported that they greatly benefited from membership in professional learning groups. Group membership aided their PD because it allowed them to learn new skills and knowledge from each other. Participation in PLCs enables interactions among colleagues, for sharing experiences and expertise, as well as learning material developed, discussing the effectiveness of new teaching and learning material, and solving problems collaboratively. The fellows believed learning and professional capability has improved by participating in PLCs. The research fellows, who are teacher educators, saw value in PLCs for teacher development.

The endline interview results showed that fellows from Maldives had frequently engaged in cross-country interactions with each other for learning, especially those who conducted action research on the same themes. This interaction began after the face-to-face sessions of the fellowship, even though the fellows had been attending online common webinars prior to that. The fellows also mentioned that they interacted more with the fellows from Nepal than with the fellows from Afghanistan. The face-to-face sessions seem to be particularly important in facilitating this interaction. The fact that the fellows from Afghanistan were unable to participate in the face-to-face sessions may explain why they have less interaction with fellows from Afghanistan. According to participants '*across the country, we only connected when we had that, when we travelled to Mumbai for the training so we had some good connection with other fellows but then after that' - (F1). Another fellow had also highlighted the need by stating that Yeah. When we had our physical sessions at Bombay, the one week, two weeks, 10 days, I think. Yeah, that time after that, um, not much of communication but we were communicating through a telegram (F2)*

More ideas from fellows supported this.

> *"I was able to connect and also from other Countries also, especially before, before the first workshop, we were taking online classes. And during that time we also have a group and things, but that time we didn't connect with them that much" - (F6)*

Engagement in formal platforms for PD

The MATPD project has conducted various PD activities through Telegram groups, Viber groups, discussion forums, discussion sessions, and webinars. Some of these groups are common to all three countries, while others are specific to a particular country. Telegram is not widely used in the Maldives, but some fellows started using it because it was required for the project. Viber is more commonly used in the Maldives. Interviews with fellows indicated that most of them engaged in these different platforms to enhance their PD. However, some fellows were not actively engaged in these groups. They were passive learners and did not share much in the groups unless required. Some of these groups were also used to share announcements. In other

words, the SATE project has used a variety of online platforms to provide PD opportunities for fellows. Most fellows have engaged with these platforms, but some have been more passive than others. '*I actually didn't write much in the groups. Only if kind of, I needed something. But I always read what they kept sharing. Some useful things were shared, reports and research were given by the head mentor' (F8)* as stated by this fellow. They regularly check these platforms to get the updates and announcements.

> *"Telegram was not like a platform that I commonly used so it was not as often that I checked but whenever there was a post I do follow but I don't think to be honest, I didn't engage in the telegram that much" - (F1)*

> *…I think I have joined all the online classes or the those programs. I believe I haven't missed any meetings and telegram I didn't write many messages. But of course, I have read all the messages and everything they put together. I mean, the fellows and of course the organizers, they put many messages every day. So I used to read all the messages" - (F12)*

Time was identified as the main challenge to actively participate in fellowship activities and also to interact with other fellows, as the scheduled activities clashed with their working hours. It was not possible for them to allocate time outside of their working hours, as some worked the afternoon shift and others worked the morning shift. It was also a challenge to find a common time for the fellows from three different countries. In other words, the fellows had difficulty participating in the PD activities because they were scheduled during their working hours. It was also difficult to find a time that worked for all of the fellows from the three different countries. '*I only found the time thing a challenge, but I think that will be always there for any program' (F6)* states it is evidence of time constraints being a barrier.

Sharing Action Research Experience

The action research findings and experiences have been shared with a variety of audiences, including other fellows, teacher educators, students, and teachers working in the project. Fellows have mentioned that they have shared their action research findings and experiences with each other through webinars and online sessions. Teacher educators who were fellows shared their research with their students. Fellow (F2) mentioned *'I have been sharing it with my students because they are also action research students both undergraduate and master, postgraduate students.* the findings have also been shared with other principals working in nearby islands. *'so yeah, so far only with some very few teachers. I have shared the the first draft, especially with the participants of my project. And with some of the principals as I have shared my findings'* (F12). Some of the fellows also shared their action research experiences with teachers who participated in the project and with other teachers who worked in their

school. Some have shared it face-to-face *'I have shared face to face with some of my colleagues'* (F4).

Platforms Used for Communication

The results indicated that the research fellows have used a variety of platforms including telegram, Viber, Watsapp and Google Meet to communicate with the teachers participating in action research. '*we used viber for official communication and emails'* (F3), *I mean the Maldivian group, it's the viber group' (*F2) and *'Viber group' (F13)* were some fellows comments on how they communicated their research. As mentioned above, fellows (F2, F3 & F13) have stated that Viber was the most commonly used platform by most of the Maldives fellows.

Increasing Participation and Engagement

Although participants have access to Telegram groups, very few actively engage with others over it. Interviews revealed that there are many ways to improve engagement on these various platforms. One way to initiate and promote discussion among participants is to share scenarios and thought-provoking questions. Facilitators should also emphasise the importance of participation at the beginning of each session. Some fellows suggested having small groups with participants who share common interests, such as principals, teachers, and teacher educators. Another strategy is to share a daily or weekly question related to action research, mentoring, the use of ICT, etc., and require everyone to comment. Regarding engagements in groups, a fellow (F4) highlighted '*I think it's very important if someone post something like that, To comment on that, even a like, or something like that Should be there*.

> *And I think we could increase participation by maybe asking a question on which people have to comment, something like that. Otherwise, it's like, you know, different people posting on different things. And it was this that, for whoever has time and who have any idea, they will comment - (F13)*
>
> *"How about putting like some kind of quiz that every day we have to like get and, or kind of post that we have to interact? Like, for example, they can post, a post a video, and they can put some questions so we can answer to that questions" - (F12)*
>
> *"…there's a teacher educator group, there's a like, you know, administration group. So, if the numbers are equal, I think there would be more interactions. Because sometimes it might be difficult for a teacher to communicate with the teacher educator and be that friendly" - (F2)*

Quantitative Findings

According to survey data, fellows belong to a wide range of online and offline PLCs. These communities include staff meetings at school or teacher education institutes, subject-specific teacher groups, teacher educator groups (e.g., English teachers, mathematics teachers, science teachers), and theme-specific groups (e.g., ICT groups, pedagogy and assessment groups). Some teachers also attend teacher conferences, district-level and national-level meetings for their PD. They are also part of committees established within the schools or institutes they are working at.

As Figure 8 shows, all of the fellows (n=15) took part in staff meetings. Next, an equal number of fellows (n=12) benefited from teacher conferences and committees established within the school. An equal number of fellows (n=9) also attended district-level meetings and subject-specific education groups. Some fellows (n=8) attended national-level meetings. However, only a few fellows (n=5) belonged to theme-specific groups.

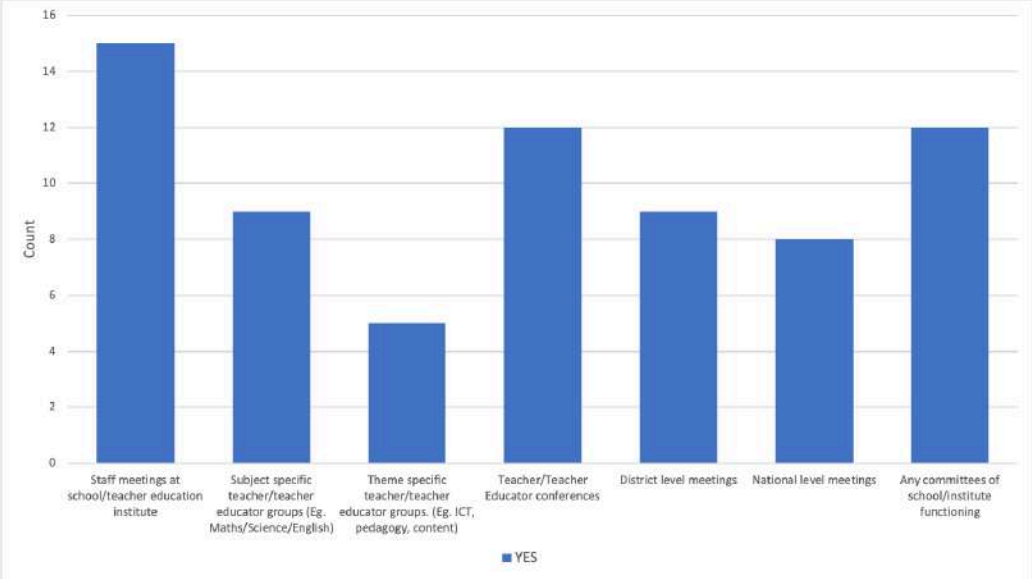


Figure 8
Participation in Professional Learning Communities - Baseline Survey

The main finding that can be drawn from the endline and baseline interviews and surveys is that initially, the fellows lacked a clear understanding of PLCs and the advantages of participating in them. However, the PLCs established within the project have significantly enhanced their comprehension of PLCs and their potential contributions to their professional growth.

Information and Communications Technology

Qualitative Findings

A multitude of insights were obtained from the baseline survey, which was carried out with a focus on the relationship between ICT and professional growth as well as its use in the classroom. The results illustrate the broad agreement among the fellows who took part, emphasizing the critical role that ICT plays in the field of education. In an era where educational content is rapidly evolving, these professionals unanimously recognize the importance of ICT as a game-changing instrument to support teaching and learning. By exploring their viewpoints, this research illuminates the ramifications and uses of ICT in the field of education.

Utilising ICT for Teacher Educator PD

The results of the interviews reveal a broad agreement among all of the respondents regarding how to intentionally use ICT to support the PD of teacher educators. All of them agree that PD programs focused on ICT are absolutely necessary. This shows the importance of teaching students the value of actively connecting with a wide variety of information sources and platforms in the context of today's educational environment.

Digital Tools and Applications: Enhancing PD in Fellowship Program

The integration of ICT, according to teacher educators, is crucial for fostering a multimodal approach to education since it gives students access to data from a variety of digital sources. Using these tools not only increases the range of available educational resources, but it also develops essential digital literacy abilities. In this regard a fellow highlighted that '*ICT plays a very important role even in students and even teachers' PD. So if they use it well there will be lot of ways they can work on it.'* (F14). In addition, teacher educators who adopt PD focused on ICT are better able to assist their students in realizing the full potential of these resources, guaranteeing that they are ready for the world that is becoming more and more digital day by day.

> *"Actively we are, they learn from those tools. And make.. where they make the learners engage in an active manner. Not as a tool where they just watch a video or not as a tool, where you present a presentation, but it should be used in such a way so that they can use it in real life. Contexts". - (F7).*

The results highlight how important ICT is to teacher educators' PD and their dedication to developing students who can successfully navigate a diverse digital environment. This understanding in turn emphasizes how crucial it is to keep up PD in this field.

Exploring Digital Tools and Applications: Classroom Integration in Fellowship Programs, Challenges, and Solutions

It is critical to change people's attitudes about ICT integration in the classroom. One important takeaway from the interview findings is the pressing need to change people's perceptions of ICT's place in educational settings. In particular, it is critical to understand that PD workshops pertaining to ICT should be viewed as a chance for in-depth learning rather than a light-hearted get-together for quick tips.

The fellows suggest that adopting ICT in the classroom is essential to remaining relevant in the contemporary teaching environment, not just for convenience's sake. Participants acknowledged this and emphasized the need to approach these workshops with a greater degree of seriousness. This kind of approach is necessary to fully realize the breadth and depth of ICT's potential in the teaching and learning process, allowing teachers to give their students more engaging and effective learning opportunities.

> *"For example, just not using it just for the sake of doing it, like meaningful situations and then Using the ICT in meaningful situations and utilizing it in a meaningful way, will help us in our PD" - (F6)*

> *"I think the perception of how we use ICT needs to be changed. And sometimes we, as I said before, also sometimes perceive it as having many computers and having Many TVs and having like this kind of Online sessions and online presentation and stuff using ICT. So that is the perception we need to change, like using more meaningful ICT in" - (F15)*

> *"I think the teachers' education can encourage teachers to look at using ICT differently because right, most of the time what happens is ICT is used. They're using ICT, but it's still traditional teaching. It's like showing a video or putting up a PowerPoint presentation, but it doesn't really make the students use these technologies to actually learn and understand or apply what they have learned in a specific context. So that's the part where teacher educators can help teachers to improve" - (F1)*

It became more and more clear in the continuing interview about how to integrate ICT into teaching and learning that teachers have access to a wealth of educational resources. With so many resources available, choosing which ones to use in the classroom requires careful consideration and a lot of time. This is an extremely important project because the main objective is to give students a rich and rewarding learning environment.

The fact that there are so many resources available highlights how important it is for teachers to choose their lesson plans carefully. By doing this, they can modify their method of instruction to fit the unique requirements and learning preferences of their pupils, which will ultimately result in a more interesting and successful learning environment.

> *"There's an ocean of learning materials. The only thing is to spend some time, searching for the right one, the suitable one for the, their level, the students level, so it is, something that makes, that transforms, the teachers teaching pedagogy as well and also to make it more, more meaningful in terms of not as a mediator but that is something that can contribute to their students learning, integrate in technology to the lessons, not only to use to draw but, in terms of information processing, information sharing that is there. So that is what we mean, what I think means making it more meaningful in their daily teaching and learning"* - *(F2)*

> *"We need to come up with a plan, meaning that not all of our interactions can be face to face, so some have to be online as well. So in that sense, we do need to, you know, come up with ways that would actually maximize our use of technology for interactive purposes. So I think and also if, if you mean, use 2 / 4 the technology to implement the intervention of this kind of research, yes, technology can also be there because the teenagers, the students are very much technology oriented these days. So we could use technology, we could help them and incorporate technology in a meaningful way. It can have two in two effects, mainly, one is to motivate them. And the other is to help them understand things better, because we are using more than one means of explanation"* - *(F13)*

During the fellowship meetings, training, webinars, the fellows who took part have not only been spectators but have actively engaged in a thorough investigation of the wide range of digital resources and tools that are utilized in the field of education. As such, a fellow stated that '*Mostly PowerPoint. Then Google Drive. We have everybody, we have a shared drive which I added to all the teachers. So they do the lesson planning, you know, every schedule, everything will be in the drive'.* (F14). Their knowledge base had been greatly enhanced by their active participation, which has also improved their comprehension of the ways in which these resources can be used to support teaching and learning. One of the fellows stated that '*Yes, one thing is the intervention that I implemented with my teachers itself is a technology one. Comic strips'* (F2)

Their interactions have produced two results: first, they have discovered tools they had not previously known about, and second, they have discovered new uses for tools they had previously used.

> *"Like, for my teaching, even now I use a lot of things to engage my students like of course the Google meet is there and the breakout rooms. The Jam board, the padlets, mentee and poll everywhere. All these kinds of engaging quiz tools and other collaborative online activity platforms have been used in my teaching and learning" - (F1)*

> *"…that poster that we were asked to prepare. That is also something which I learned from that program. Yeah. And then there were some other things also which are very interesting. two things which I found very interesting were poster preparation using that tool that was taught to us" - (F4)*

Furthermore, it is significant that this shared experience has illuminated the various difficulties that come with using these applications, a point that was crucial in the continuing interviews. By recognizing and resolving these issues, the fellows are developing a more comprehensive and nuanced understanding of the digital landscape in education in addition to increasing their technological proficiency.

> *"But very recently for making the video of the presentation I used a video editor and things like that. So when the need arises..and Yeah, I faced it just because it was new. But once I got to know, got to know, or started engaging in the course in an active manner, I got used to it" - (F7)*

Digital Tools and Applications for Teacher Training in Fellowship Programs

A wide range of digital tools and applications that are used in the classroom and for teacher training were covered throughout the interview. As mentioned by one of the fellows, *"Yeah, I used that virtual lab for scientific experiments, right? So that's the tool that I used and then normally the PowerPoint and stuff I used. Special thing is the virtual lab which was introduced to the teachers. " - (F8)*

Alongside these revelations, attention has also been drawn to the different obstacles and problems that teachers run into when using these programs. This two-pronged investigation highlights the intricate relationship between technology and education, illuminating the challenges and obstacles that educators must overcome in order to fully utilize digital resources.

> *they were given printed comic strip, but they knew that the online tools are there to create their own comic strips, even So, that means that there is something they can use and yeah, that is, that is the one thing that I have used even though I was aware of it and the teachers explored, the students explored, so hopefully they will be using it instead of those printed ones". - (F2)*

"Only challenge I think was that students find it difficult to see how. And one thing I find is that because of some of these platforms, it's better utilized if they have their own computer system, like a computer desktop or laptop, but some of this doesn't work if they are joining from their phone. So that's, and also the internet connection". - (F1)

Integrating Technology, Pedagogy, and Content Knowledge in Classroom Teaching and Learning

The topic of Technological pedagogical Content Knowledge (TPACK) in teaching and learning was brought up as the interview conversation went on. The discussion covered the various ways that the fellows integrated technology, instructional strategies, and content in their lessons. The specific justifications for the choice of specific technologies were further explained, as was the way in which these resources would be seamlessly incorporated to support significant teaching and learning opportunities. A fellow had described a model used for integrating ICT saying that *"LMS model platform, where it's very easy to do if there is a pre-activity to be assigned or prequiz to be completed or discussion forum for them to put into everything can be incorporated in the LMS management."* (F1)

"… for example, if it is SPSS, I would introduce the tool to the teachers and then ask what, how they can use the tools,the purpose of the tools and then I will get the teachers to develop a data set and then to analyze the data using an… to find find to analyze the findings, using the tools. So get them hands on experiences in using the tools by using. What can you say about their own data sets, develop their own data sets and then use the tool to analyze on their own, for example, on their own for example that can be something that I can do" - *(F7)*

"These Technologies involve things that students can do, so. The activities and things can be done by students. So, the student involvement will be there. But if this is carried out in a way that enables students to be involved, only, this will be helpful. Maybe a project based lesson giving the students to do a project using different ICT tools. Could be a good one. As I said, rather than showing videos and PPTs to the students. So using ICT, I think project based learning. If you can enhance that will be the best thing we can do" - *(F6)*

"They can use different websites, different journal articles, to find two different cases. Let's say even it's being practiced in my classes but it can be advanced in terms of finding the contextual differences in terms of implementing action research. Action research. For example, a Western one and an Asian context. So that can be explored by students and then, compared and then come up with a PowerPoint presentation in terms of presenting their different cases so questions can be given. And so I think this way, content and technology can be incorporated" - *(F2)*

It is noteworthy, nevertheless, that none of the fellows specifically cited the TPACK model itself in the findings. Rather, they expounded upon the distinct approaches they intend to utilize in their classroom environments, emphasizing how they personally approach the efficient use of technology. This demonstrates how the technology integration strategies that were covered during the interview were both customized and useful.

Future Perspectives in Fellow-led Exploration and Integration of ICT in Teaching Practices

The future utilization of ICT and its useful applications in teaching and learning were discussed in the interview. The fellows who took part in the discussion expressed different approaches to incorporating ICT into educational environments.

> *"Very recently, we came out of a very Serious situation, pandemic. So we me, we should always be prepared for such situations so we should always Whoever it is, who is in working in the teaching field, I think should be prepared to work in hybrid manner" - (F7)*

> *"I think it is very important to use ICT in our practice and because ICT is already A very important part of our lives this increases the relevance and things like that. So, If being used, it's important to use ICT, but should find a balanced way to use it, like not always, or not just for the sake of using. There should be a balance." - (F6)*

> *"Yes, of course. I mean, even to conduct lessons and as I said before I'm not. I'm not directly engaging in teaching and learning. It's difficult for me to answer specifically those questions, but I can encourage the teachers to use those things in their lessons. That's what I can do" - (F15)*

> *"… the field visit to the schools and their pilot ones in Bombay. That was a really good eye opener for me in terms of integrating ICT with content, especially under project-based, problem based learning. So sure they'll be, and also I'm sharing these ideas with my teachers, you know, because they are practicing teachers, so that they can, through this way, I can encourage them to use in their classrooms" - (F2)*

It is important to note that there are numerous advantages to utilizing ICT, which was discussed from various angles:

Enhanced Engagement:	Students' attention is captured and active engagement is fostered by ICT, which provides interactive and multimedia-rich learning experiences that make learning more efficient and pleasurable.

Customization:	Teachers can use ICT to modify lessons to fit each student's unique learning preferences and rate of progress, giving them individualized challenges and support.
Access to Global Resources:	Students can study a wide range of facts, viewpoints, and educational materials from around the world thanks to ICT, which gives them access to a huge pool of online resources.
Collaborative Learning:	Through the use of technology, groups can work together on projects and engage in activities that develop the communication and teamwork skills necessary for success in today's workforce.
Data-Driven Insights:	ICT makes it possible to gather information on student performance, which gives teachers the power to modify their lesson plans and make well-informed decisions.
Relevance to the Real World:	By simulating real-world applications, technology use helps students get ready for the digital demands of the workforce.
Sustainability:	The use of digital resources helps to preserve the environment by reducing the need for paper and other tangible materials.

Quantitative Findings

Enhancing Teaching and Learning Experiences using ICT Devices

It is clear from the baseline survey results regarding technology access that every fellow (n=15) possesses a smartphone or mobile device with an active data plan. This technology is widely used, particularly to support group discussions about teaching and learning. Apps like Facebook Messenger, Viber, and WhatsApp have shown to be effective means of facilitating group discussions about the difficulties faced in the classroom. (See Table I1)

It is also important to note that all of the fellows (n=15) have access to computers, laptops, and/or tablets in order to guarantee self-sufficiency and the best possible preparation for classes. Their ability to effectively plan and carry out their teaching activities without depending

on school facilities is made possible by this varied collection of devices, which improves the calibre of their educational endeavours.

Based on the findings, it is understood that almost all the fellows (n=15) use computers at the school computer laboratories for various tasks of teaching and learning. This includes for the preparation of class presentations and activities and collecting resources for the interactive part of the class activities. The school computers are being used by the fellows for simple administrative tasks as well. Computers are being used at home for personal development activities and leisure tasks also for official purposes. However, it is noted that most of the fellows (n=8) mentioned that a computer cafe or centre does not exist hence they do not use computers in that place. (See Table I2)

The baseline survey results reveal a diverse array of technology devices utilised by the fellows (n=15). These include mobile phones, laptops, computers, tablets, and, in some instances, more advanced tools such as smart boards and LCD projectors. A notable trend is the integration of TVs with computers, underscoring a multifaceted approach to technology in teaching and learning. The incorporation of digital cameras is frequently used among the participants where (n=6) have never used digital cameras and (n=4) do not have. However, it is worth noting that the utilisation of satellite classrooms is not widespread, with very few fellows (n=2) having experience in this specific technological setting. (See Table I3)

Integration of ICT in Teaching and Learning

The baseline survey data reflects a notably positive response from the fellows regarding the integration of ICT in teaching and learning. There is a widespread engagement with technology, with participants actively browsing the internet for personal use daily (n=15) and, importantly, to gather teaching materials and resources for lesson preparation (n=9). A significant observation is the prevalent use of PowerPoint presentations daily for conferences, meetings and other purposes showcasing a commitment to leveraging digital tools for effective communication.

Furthermore, the fellows are actively involved in creating digital learning materials, thereby, fostering interactivity within the classroom. The utilisation of the internet for PD activities and participation in online teacher communities through platforms like WhatsApp groups exemplifies a dedication to continuous learning and collaboration.

A distinctive practice noted is the documentation of classwork through video and audio, with mobile phones being utilised to capture moments for later review in the classroom. However, it is important to note that the use of smartboards is relatively limited among the fellows (n=10), indicating potential areas for further exploration and integration of advanced interactive technologies in the teaching environment. (See Table I4)

Versatile and Comprehensive Utilisation of Digital Tools

The activities involving laptops and computers among the fellows (n=15) showcase a versatile and comprehensive utilisation of digital tools used on their own without any difficulty. The common applications and functions include:

Word Processing:	The use of word processors or notepads for document creation and note-taking.
Presentation:	Creating and delivering presentations through tools like PowerPoint.
Data Management:	Utilising spreadsheets for organising and analysing data.
Visual Design:	Engaging in creative activities with tools like Simple Paint and exploring different internet browsers for online research.
Communication:	Sending emails for efficient communication and recording audio and videos for various educational purposes.
File Management:	Downloading and uploading files to facilitate resource sharing and collaboration.
Simulations:	Incorporating simulation-based teaching and learning approaches to demonstrate experiments, enhancing the experiential aspect of education.
Virtual Collaboration:	Using video conferencing for virtual meetings and collaborative discussions.
Mathematics Teaching:	Integrating Geogebra for mathematics lesson plans, showcasing a dynamic approach to teaching mathematical concepts.
Multimedia Creation:	Creating picture stories through text and image editing, adding a multimedia dimension to lesson plans.

This comprehensive integration of digital tools illustrates a sophisticated approach to leveraging technology for various aspects of teaching and learning, showcasing a commitment to innovation and effective educational practices (See Table I5 for details)

Proficiency in Utilisation of ICT for Enhanced Education

In assessing the fellows' proficiency in using ICT, a recurrent theme emerges regarding the effective utilisation of online resources. Many fellows (n=14) adeptly locate instructional videos on the internet to supplement course content, leveraging various search engines for this purpose. Notably, social media platforms such as Facebook and Twitter are commonly employed for educational pursuits, serving as channels for sharing valuable materials found online. The prevalent use of Google Drive, particularly in conjunction with Google Classroom post-COVID-19, underscores its significance in facilitating seamless teaching and learning experiences.

While a subset of fellows (n=13) utilises bloggers as an outreach platform to students, it's observed that computer ethics awareness is less frequently mentioned. The creation of animations emerges as a popular method, with fellows actively seeking or generating animations to enhance engagement and interest among students during presentations. This multifaceted use of ICT underscores a dynamic and resourceful approach to integrating technology in the educational landscape (See Table I6)

Beliefs Regarding Use of Technology in Education

In the section on beliefs about the use of technology, the baseline and endline studies reveal a consistent positive mindset among the fellows regarding technology's role in teaching and learning (See Table I8). They express the belief that integrating technology enhances classroom instruction and practice. The recognition of effectiveness in instruction when teachers collaborate with peers or experts is a shared perspective.

The availability of ICT resources is acknowledged to positively impact productivity and professional effectiveness in teaching and learning, reinforcing the importance of technological tools. There is a collective belief that technology integration can enhance students' learning outcomes, despite concerns about potential student complacency.

While acknowledging the risk of increased passivity, the respondents emphasise that computers aid in grasping complex concepts and curricula. Notably, the use of computers is associated with the creation of more engaging and interesting student projects, fostering increased participation.

The fellows expressed confidence that technology integration strengthens collaboration and relationships between students and teachers, contributing to more effective learning environments. Moreover, the belief in technology's role in developing technical skills and applying real-world examples aligned with the conviction that technology is a valuable asset in modern education.

Factors Influencing the Adoption of Technology in Education

The influence to use technology among the fellows (n=14) is notably driven by observing other teachers incorporating ICT in teaching and learning. Witnessing examples and sharing experiences of how technology is effectively used by peers serves as a significant motivator. Additionally, school-level PD, along with adequate resources, support, and mentoring, emerges as a substantial influence, as it is perceived to be evaluated in this context (Figure 9).

Furthermore, the enthusiastic interest of both students and parents in using technology within the school setting is highlighted as a compelling factor. This collective enthusiasm underscores a broader community acceptance and support for the integration of technology in education, fostering a positive environment for its adoption and implementation.

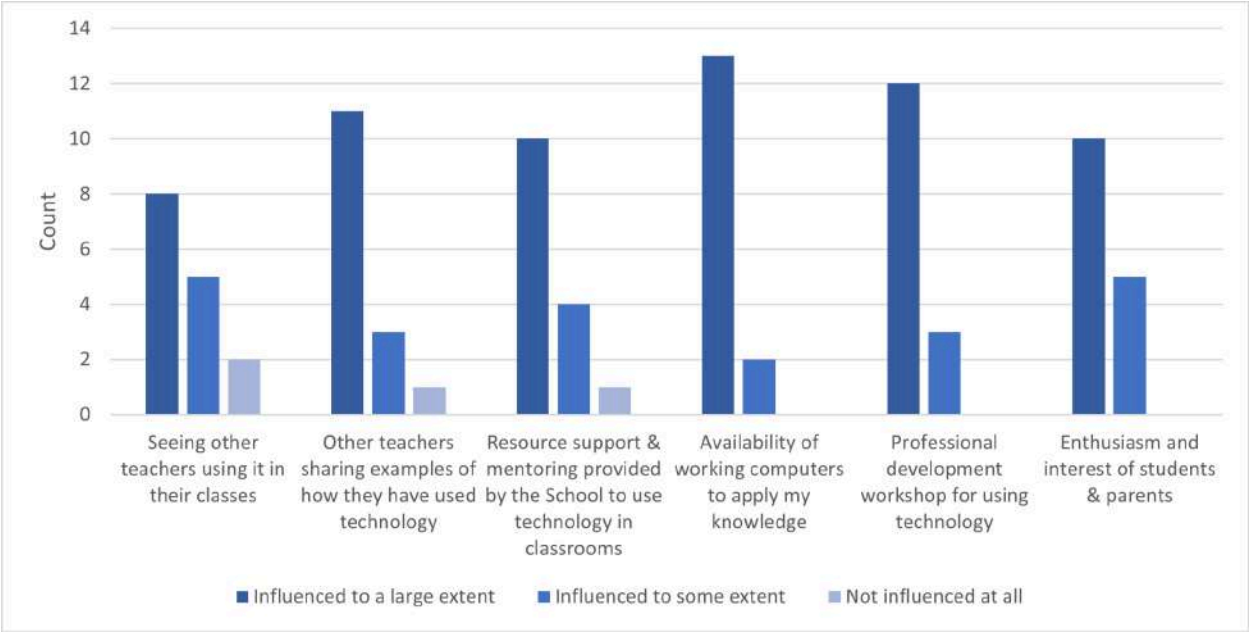


Figure 9
Influence to Use Technology - Baseline Survey

Challenges in Implementing Technology in Education

Despite the positive attitude towards integrating technology in teaching and learning, significant challenges have been identified by the fellows (n=14). Key obstacles include a scarcity of computers or laptops in computer labs, extremely slow internet, and the high cost of internet services. The lack of universal access for all students, often due to limited resources or poor connectivity, poses a considerable hurdle. Insufficient training for teachers to effectively use technology, coupled with limited opportunities to practise acquired skills, is highlighted as a prevalent challenge. In regions such as islands, additional difficulties include unstable power supply, outdated computers, and obsolete software.

Moreover, the crowded nature of classrooms with too many students makes it challenging to address the individual needs of each student, especially those requiring special assistance. A notable absence of leadership support further compounds the obstacles faced in implementing effective technology-enhanced teaching and learning strategies. These challenges underscore the need for comprehensive solutions and support structures to ensure the successful integration of technology in education. (See Table I7)

The results from the baseline and endline surveys indicate that letting learners observe the reflection of light on a white paper screen and drawing conclusions is consistently perceived as the most effective strategy for providing a meaningful learning experience and explaining the concept of reflection of light.

Perspectives on the Impact of Technology in Education

Despite the identified challenges, there is a noteworthy shift in perspectives regarding the effectiveness of animated videos on the concept. While the baseline study highlighted animated videos as a meaningful strategy (n=14), the endline survey reveals that not all fellows consider it useful (n=9). This shift suggests a nuanced evolution in the perception of the effectiveness of animated videos for teaching the concept of reflection of light over the course of the study (Figure 10).

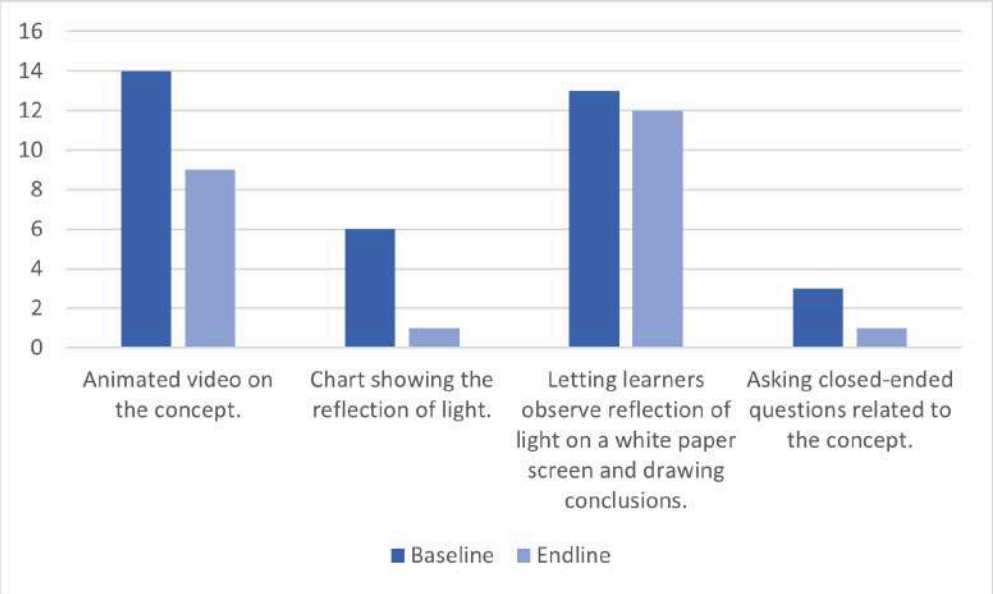


Figure 10
Strategies that can Provide Meaningful Explanation - Baseline Endline Comparison

Teaching Method and Learning Theory

The baseline and endline study results indicate no significant difference under the question that tests fellows knowledge of teaching method and learning theory. The fellows (n=15) consistently highlight the utility of real-life examples and applications in teaching the concept of correlation, emphasising the role of technology-based activity theory of learning. The integration of technology is seen as aligned with the theory of Constructivism, leveraging real-life experiences and examples in the teaching and learning process. Furthermore, the respondents recognize the survey method as an effective approach for learning information processing. This consistency in perspectives underscores a shared belief in the efficacy of these teaching methods and learning theories throughout the duration of the study (Figure 11).

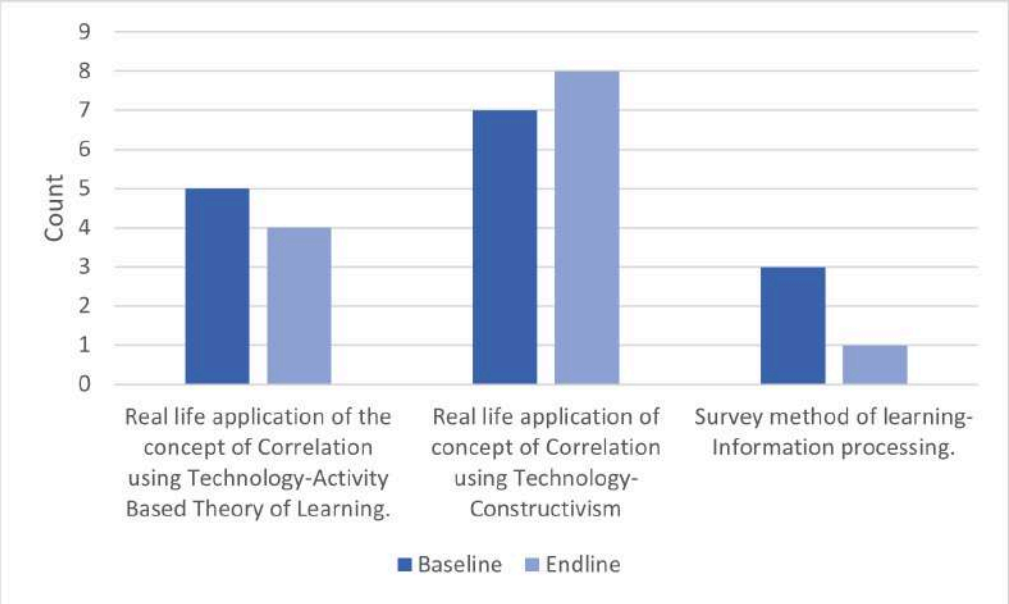


Figure 11
Teaching Methods and Learning Theory - Baseline Endline Comparison

Meaningful Integration of ICT in Teaching and Learning

The respondents consistently highlighted several meaningful ways of using ICT in teaching and learning. Creating a weather chart using a spreadsheet to compare temperatures in two cities, conducting research on water usage in households using Google Forms, and having students create multimedia presentations or projects to learn about the effects of natural disasters in India are all noted as impactful methods. Therefore, there is no significant difference between the survey results of the baseline and endline data. This suggests a sustained agreement among respondents regarding the identified meaningful uses of ICT in the context of teaching and learning (Figure 12).

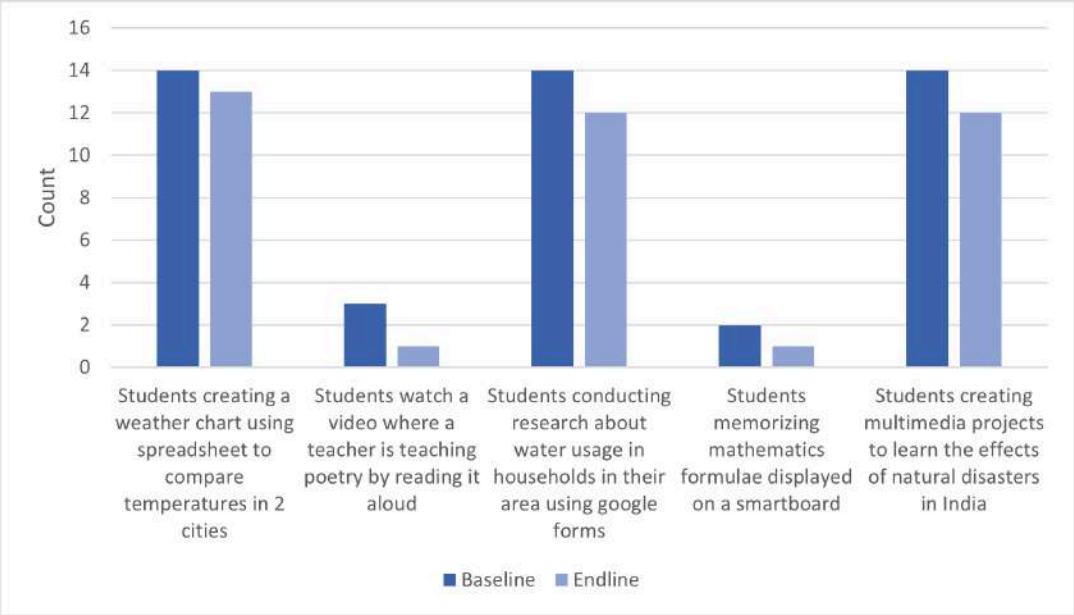


Figure 12
Meaningful Integration of ICT - Baseline Endline Comparison

Asynchronous Communication Tools - Baseline Endline Comparison

In the context of online learning, all the asynchronous communication tools identified, such as Moodle, Telegram, and discussion forums, were considered useful by the fellows. Additionally, applications like Zoom, Microsoft Teams, and WebEx were recognized as examples that cater to both synchronous and asynchronous learning methods. This comprehensive acknowledgment of the utility of various tools underscores the adaptability and versatility of the mentioned communication and collaboration platforms in the online learning environment. (Figure 13)

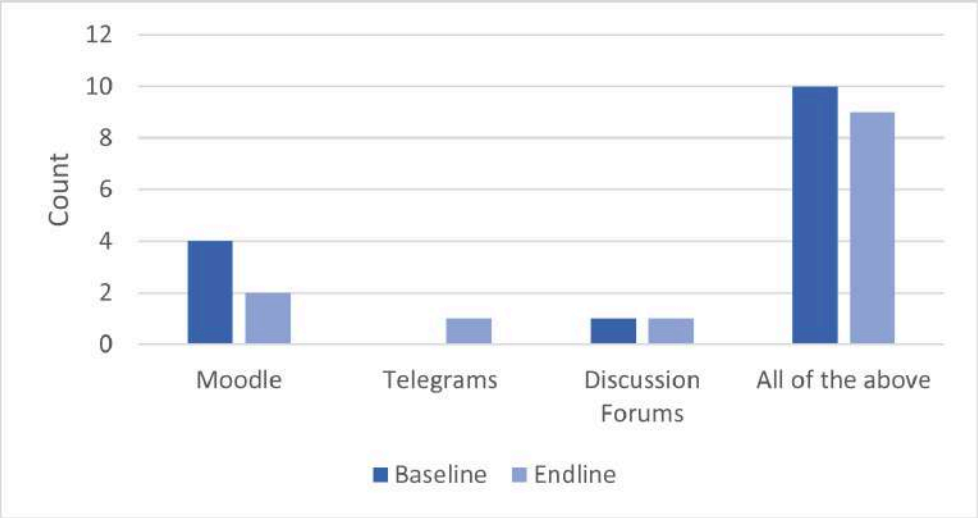


Figure 13
Asynchronous Communication Tools - Baseline Endline Comparison

To conclude this section regarding the ICT, in examining the intersection of technology and education through baseline and endline survey data, several key themes have emerged, shedding light on the attitudes, challenges, and strategies employed by the fellows and field mentors. The positive attitude towards integrating technology in teaching and learning is evident throughout both studies. However, this optimism coexists with substantial challenges.

In conclusion of both qualitative and quantitative analysis, the journey through this chapter elucidates a dynamic landscape where optimism and challenges coexist. The commitment to leveraging technology for enhanced teaching and learning experiences is evident, with an understanding that overcoming challenges require strategic interventions and collective efforts to build a technologically enriched educational future.

Collaboration

Qualitative Findings

Experience of Collaboration

During the baseline interview, all fellows reported having collaborated with either their colleagues or other researchers and shared their experience of collaboration. Fellows believe that collaboration has helped them to generate new ideas, to learn from other's experiences and to work with them as well. A fellow (F1) mentioned, *"...collaborative discussion conversation will help to identify the problem and gather ideas to the best way to tackle the issues."* Other fellows felt that collaboration has saved time, and works more efficiently and believe everyone should have a positive attitude towards collaboration.

> *"I am also hoping to learn new concepts or concept that I might have taken for granted as well, as this focus us to think us to collaborate with other practitioners, practitioners around the world so I think this way also it improves my knowledge and understanding, plus it will also benefit the teacher trainees in our courses and also we get chance to collaborate and interact with in-service teachers at the same time" - (F13)*

Results of the baseline interview also show that fellows most commonly have discussions with colleagues where they share their experiences and discuss new methods of teaching a specific topic, ways of doing things, and areas that need improvement. Another activity fellows collaborate include preparing classroom activities. For future collaborations, one fellow expressed interest in finding new ways to bring variety and include more people in collaborations, whereas other fellows want to find ways to integrate ICT and are hoping to learn new knowledge through collaboration.

> *"I learned a lot about researching, working with people, different ideas, different tasks, developing them in the best way possible, I mean, there are a lot. For example, each when a task is given there are ways to develop, but to present it in a suitable way to all" - (F6)*

Collaborations During the SATE fellowship

During the endline interview, fellows were asked about the activities done collaboratively and individually in their action research. In response to that question, the majority of fellows responded they had discussions sessions with teachers to brainstorm and generate ideas. More specifically fellows have collaborated with teachers in the design and planning process to understand the best way to go about in achieving the objectives of their action research.

Additionally, fellows collaborated with teachers to prepare worksheets, lesson plans, activities and conducted collaborative reflections as well.

> *"Collaboratively we did the lesson plans. I divided the teachers into two, three groups, two teachers in each group, so one group was doing about social awareness, the other two was doing on relationship skills and another group was doing on empathy" - (F14)*

> *"Once they got a grasp of the concept of Toulmin's model and how to use it in context, I asked them to write their own pieces, then which they exchanged. And then we analysed again, and when once they felt that they were confident about it, then chance was given to plan lesson using Toulmin's model" - (F13)*

It is worth mentioning that collaboration was not only limited to physical interactions. In the baseline interview, many fellows highlighted online collaborations, where they share ideas and work on shared Google documents, slides or classroom, sometimes simultaneously communicating via online meeting or chats. Similarly, it was found from the endline interviews that some fellows shared google documents with teachers to collaborate and share ideas with each other during the action reach process. Furthermore, Viber or Whatsapp groups were also used to communicate in collaborations.

> *"We have done things, collaboratively mostly we have used Google docs to actually brainstorm the idea. So each one can collaborate and write their own ideas and we have used Google Drive to share the forms and share the information that everyone needs to access"- (F10)*

> *"....So everybody can chat within the Google Slide and everybody can do their own slides in the Google Slide. We will see each other's slide as well. They can comment on each other's slides, and we will carry out it in the PD session….." - (F10)*

Interestingly, some fellows have highlighted the mentoring process as a collaborative activity. One fellow (F5) stated *"I would say it's collaborative effort because as a set of my mentors, help me, they guided me to refine my topic or refine the chapters as well",* while another fellow (F10) said *"But being a mentor, we will be giving them different solutions rather than collaboratively"*

On the other hand, fellows were also asked about activities done individually during the fellowship, which included designing and planning the action research For example, fellows have prepared teaching aids, teaching kits, templates and prompts for teachers to use in the action research implementation. Although many fellows mentioned that lesson planning was done collaboratively, there was one case where lesson planning was done individually by teachers in the second cycle. One area many fellows stated that was done individually by

teachers was the implementation of intervention. A fellow (F12) said, *"...individually of course the teachers they have implemented that lesson plan in the classroom. So I didn't I didn't work with the teachers in the implementation process".* Similarly F13 also stated *"... individually of course the teachers they have implemented that lesson plan in the classroom. So I didn't I didn't work with the teachers in the implementation process"*

Collaboration for PD

In terms of collaboration for one's own PD, in the baseline interview one fellow mentioned exchanging teaching videos to give feedback to each other, while another fellow reported doing peer observation of each other. Later in the endline interview fellows were asked about any collaboration with teachers and teacher educators for PD during the fellowship. While a few fellows specifically mentioned that they did not collaborate, one fellow discussed contacting other fellows from the Maldives to discuss the challenges, data collection and ways to successfully complete the fellowship.

> *"For example the videos that we were both of us were taking the same topic for two classes. Same module we were teaching so after preparing the video, I used to send to her and then she will test on it and then she prepare the video and then she send to me and then we both of us check on those" - (F4)*

Additionally, it was found from the baseline interview that fellows collaborated to conduct PD sessions, where they used each other's strength. A similar finding was identified from the endline interview during the fellowship, upon request, one fellow conducted a PD session for school teachers and the fellow labelled this as a collaboration with the school.

Quantitative Findings

The baseline survey results show most fellows (n=12) discuss with colleagues their teaching problems and what they believe is important in education on a daily basis (n=8) and a few times a week (n=4). Other collaborative activities, some fellows engage in daily with their colleagues include; supporting with teaching problems (n=6); sharing learning experiences (n=7), new teaching ideas (n=5), ways they deal with classroom events (n=6); and discussing improvements and innovations of education at their institutes (n=6). However, few fellows engage daily in constructing digital teaching and assessment materials (n=3), preparing lesson plans (n=4), experimenting with new teaching methods (n=2) and studying students' performance data with colleagues (n=3). Additionally, most of the fellows (n=11) reported that they have never written a new curriculum with colleagues.

Endline survey findings show that there is a slight shift from the baseline survey in the frequency of engagement in collaborative activities. Surprisingly, this shift not only happened in activities that were found to be the least frequently engaged by fellows but also in activities that were frequently engaged too (Table J1 and Table J2). To confirm the significance of this change a paired sample t-test was conducted. The results presented in table 10 show that there is no significant difference in the frequency of engagement in collaborative activities pre (M=3.30, SD= 0.984) and post (M=3.37, SD=0.990) fellowship, t(12)=0.228, P=0.823. Since the p value is greater than 0.05 it can be concluded that there is no significant increase in the engagement of collaborative activities post fellowship.

Table 10

Paired sample t-test on Collaborative Activities

	Mean	Std. Deviation	Paired Differences		t	df	Sig. (2-tailed)
			Mean	Std. Deviation			
Collaboration_Endline	3.37	.990	.063	.274	.228	12	.823
Collaboration_Baseline	3.30	.984					

Gender Equality and Social Inclusion

Qualitative Findings

Understanding of Inclusion

Findings on Gender Equality, and Social Inclusivity in Maldivian education settings on the concept of inclusion revealed that the teacher educators generally have a clear understanding of the concept of inclusion in the Maldivian context. For the fellows, inclusion means, including everyone regardless of their socioeconomic background and other individual differences, no matter what that situation is, all individuals have equal opportunities for a quality education. The following excerpts illustrate teachers' description of inclusion as the practice of including every person, irrespective of their gender, religion, or ability level, in learning and in all aspects of what an individual needs.

> *"…I believe is inclusion, no matter what age, what, what can you say? What spectrum, you belong to. What sex you belong to, equal opportunity should be given to each and everyone to education…" - (F17)*

> *"Inclusion is a regardless of the background, gender and the ability everyone, doing the same, everyone being included to do or even if we take education, included, regardless of any discrimination, I would say, included in everything and taken as equal participants equally" - (F2)*

> *"I think inclusion means not, not leaving anybody behind whether it's teachers, whether it's students. So, to some extent in the Maldives inclusion is there I believe" - (F5)*

Diversity within Classroom Settings

Based on the endline interviews, it is observed that fellows experiences on diversity in teaching are somewhat mixed. Fellows indicated that diversity as individuals with different religions, race and ethnicity. Thus, the responses varied in nature. The following excerpts indicate fellows' experiences.

> *"We don't have, we have students from same culture, same religion. Diversity in terms of I mean, we, we don't see multicultural diversity here, but we see is a monoculture. But then we have to, of course, two gender"- (F13)*

> *"In my teaching experience. I had some foreign students in my class one or two, not much. But even if they, if they are not, foreign students, as a teacher, I think you should ensure that every student in your class is treated fairly equally. So I do maintain that" -*

(F5)

In contrast to the above statements, some fellows describe diversity as individuals with different abilities. The following excerpts illustrate this notion.

> *"In my teaching experience, I don't have much of the diversity because I wasn't, but then, as far as I can, learn from my observations and conversations. I think that diversity now, the challenging part is having different students with different learning disabilities, or different physical disabilities all in one classroom where they can have their own, catering to their own individual abilities".* - (F1)

Challenges in Inclusion

Fellows indicated that teachers face a number of challenges with matters regarding inclusion within classroom settings such as planning classroom activities and catering to different levels of students, getting resources to prepare for classroom teaching targeted to students with different learning abilities, and handling large numbers of students.

The following excerpts illustrate fellows' observations and experiences on challenges faced by teachers in matters of inclusions within the classroom settings.

> *"...there'll be a lot of challenges, right. Because we have like this one teacher. Who has to teach like 30 students and then 30 or 32…" - (F5)*

> *"I would say in terms of resources" - (F2)*

> *"think for example there are different learning abilities also. So in a topic the lesson should be planned considering all these things and sometimes If the same thing is given to everyone, it might not, All the students needs might not have been addressed. Things like that" - (F15)*

Inclusion and Diversity in Teacher Selection

In terms of selection of teachers for action research, fellows adopted a number of strategies, including selection of teachers who are teaching specific subjects related to their topic of the action research, teachers who are familiar with project based learning, teachers who are available to be part of the study and their experience in teaching. The following excerpts highlights the fellow's selection criteria and their rationale for it.

> *"my criteria was like any teachers teaching biology of Key Stage 4. Yeah, that was my criteria"- (F8)*

> *"This is a science topic. I selected science teachers."- (F6)*

"I wanted all of them to be English as a second language teachers. Teachers who are already teaching in the schools, the secondary grades and also who are passionate about these type of discussions because my topic already is something very different from what they usually teach in the classroom" - (F3)

"...the teachers in key stage one and Key Stage Two, they are very familiar with this project based learning"- (F12)

"I think we have just worked on one thing: availability. That's all I didn't check for any other like you know because if we are to check for many factors, I felt like we were not getting teachers already, we were in short of teachers" - (F10)

Majority of the teachers, especially in pre-primary and primary grades, are female dominated. In most of the key stages and subjects that fellows had to choose from, there had been very few or no male teachers. Hence, most fellows had no choice but to work with all female teachers. However, there are few instances where male teachers, that fit the criteria, took part in the action research. There was a case where male teachers' responses were not positive in taking part in the action research. In some of the action research conducted at outer islands, fellows included expatriate teachers too.

"All seven female teachers participated. Because in the grade there are no male teachers" - (F4)

"There were no male teachers the teaching in the class as class teachers, so all which is female. So I had no choice in choosing or balance in the gender"- (F7)

"I had two females and because they can be again, we have only male teachers or not only like majority of males is when it comes to secondary teaching. so, I had 5 male and 2 female teachers."- (F15)

" I did approach some male teachers but I didn't get a positive response from them so well"- (F3)

"I thought the expatriates are more reluctant to try out new, new approaches to be frank. But then the one that I who was who participated in the research proved to be as equally cooperative" - (F13)

Inclusion and Diversity during Action Research

Another area where inclusion and diversity were explored was when teachers conducted classes for action research. In the endline interview some fellows mentioned that they have observed teachers engaging with more vocal students and neglecting others. This is not

something teachers do consciously. When pointed out, teachers agreed and tried to engage all students. In some classes where there were students with learning difficulties, fellows observed they were less involved in classroom activities compared to others. However, teachers tried their best to involve those students. Contrary to this, special educational needs students took part in activities in his/her capacity.

> *"..they weren't doing it consciously, but in some of those teachers tend to engage more with students who are more interactive with them, like more vocal students, and then maybe some students in the part of the classroom who are bit neglected in the sense that they didn't get equal attention. I pointed this out and then they did agree. They said it's like, because they haven't been asking questions and so on, but then, you know, it could be problematic. But then I did talk I did point out to them that you know, so there are some students who are not getting your attention. So, so once I did that they tried to change" - (F13)*

There was one action research where there were few foreign students from other religions present in class. Due to this, teachers were a bit hesitant to discuss global issues related to religion.

Some of the fellows did not observe the classroom implementation, although they discussed how it went later on with teachers. Two other fellows mentioned that they did not observe any exclusive behaviours.

> *" I did not find any sort of, you know, because we have like girls and boys mixed classes. So I haven't seen any of those" - (F5)*

> *"no, I don't think those things were observed there" - (F16)*

> *"I did not do any observations based on my experience and based on teachers' feedback, this, what, issue was identified as English writing. Yeah. No, no prior observations done. Yeah" - (F2)*

Inclusive Pedagogical Practices in Action Research

During the endline interview, fellows were also asked about the inclusive pedagogical practices they had used in their action research. The findings revealed that most of the fellows adopted group activities, in which small groups that consist of different ability students are formed. In these groups, tasks were distributed among students, so each student works on an activity they are good at. In cases where groups were given questions, a variety of questions that differ in difficulty levels were provided.

"...collaborative learning like groups, they have made groups including everyone, and they have given different tasks to different students. So those who are good at drawing, they were able to participate in that and those who are good at speaking, they were actually presenting their work and those who are good at using ICT, they were doing ICT work like preparing the presentations, making the videos, those kinds of things" - (F12)

"...we did the group work, where there were different characters so, different types of different level of questions were asked by the teachers and then as a group work, they were asked to discuss about the characters and then write it down so that all different levels of students can participate" - (F4)

Other inclusive practices fellows adopted include changing seats in group formation, assigning work in pairs, using words of encouragement, giving the opportunity to choose both physical and online lab experimentation, taking the activities outside the classroom, framing the worksheets and experiments in a way that all students can follow. The following excerpts are what fellows have mentioned regarding inclusive practices.

"...one teacher highlighted these SEN students' interest and his concentration and his involvement in coming up with the comic story maybe not with the writing, but he was so, so into it that the whole period he was colouring, he was drawing because that was something beautiful to listen to from the teacher and even the teacher was surprised and the child was asking to take photo of him and then to show his mother and all that. So that was something really, how would I say? Really touching to see a SEN child performing differently. So I guess through the activities, how the activities was planned and organised, it enabled the students' involvement regardless of their abilities and their background or anything…" - (F2)

"...high order questions, Low order questions, different ability, tasks, I asked, the teacher to include, you know, so to make groups, so that all the students are engaged" - (F7)

"We had a lot of group activities, and Also picture description, not descriptions, but more like pair work. So, using a picture, relating it to their own self, and then a discussion like that. Also, the teachers focused a lot on using verbal rewards, encouragement, reinforcement, things like that" - (F3)

"I did recommend changing seats and you know, group formation because so to mix those vocal students with others because otherwise what, what is happening that there are, there are some students who are always silent and they kind of escaping maybe from the teacher's attention or maybe they don't even bother or maybe they are. So I wanted to mix them together. So that happened and I think that trying to improve the classroom dynamics" - (F13)

Quantitative Findings

Findings from the baseline survey indicate that most of the time (n=6) the schools and education institutes are inclusive as they allow students with disabilities to study with other students. Additionally, there are no separate schools for students with disabilities. In other words, regardless of the disability, Maldivian schools accommodate all students. However, sometimes (n=10) some schools do not have special educators for students with disabilities. It is rare (n=10) that schools will have adequate infrastructural resources for students with disabilities in the schools. Similarly, sometimes (n=8) we have teachers who are trained in methods and pedagogy that can support learning of students with disabilities. Sadly, we rarely (n=10) find teachers who are keen to help students with disabilities. But it is noticed that sometimes (n=9) parents are interested in education for children with disabilities. Most of the time (n=14) girls are given equal treatment in schools. Additionally, in terms of inclusion, findings also suggest that most of the time (n=10) students from economically poor backgrounds are given equal treatment. However, it is noticed that teachers are rarely (n=8) prepared to address learning issues of students with disabilities. (See Table K1)

It is also noticed that students with disabilities rarely (n=10) get adequate time from the teachers in the integrated classrooms and sometimes (n=11) students with disabilities are not preferred in integrated classrooms due to their behaviour problems. Furthermore, it is at times and rarely (n=6) that students with disabilities and economically weaker sections get extra time and assistance from the teachers. However, most of the time (n=10) all students irrespective of their gender, class and ability, get the opportunity to express their ideas/opinions in the classroom.

Section IV: DISCUSSION

MATPD

The MATP project was developed to address the gaps in the PD of teachers and teacher educators in Afghanistan, Maldives and Nepal, particularly in response to the requirements of the evolving educational reforms in these countries. The use of distance learning technologies, action research and professional communities of practice remain largely untapped opportunities for TPD in these countries.

The fellowship designed for teachers and teacher educators was practice-based and was conducted in blended mode. The objective of the study was to develop a critical understanding about constructive and inclusive use of ICT technology meaningfully through distance teaching and learning for supporting teachers. Each participant, taking the fellowship, shares the newly acquired skills and knowledge with other teachers and conducts action research. All fellows participating in this fellowship were briefed about the fellowship and their role in this fellowship. The fellows seem to grasp a good understanding of the fellowship and their role in the fellowship. Many joined the fellowship with a positive mind, believing that this is a good opportunity for them to learn and to share their knowledge and was viewed as an important aspect for PD. This is a strong indication of the successful completion of the fellowship by the Maldivian fellows who had an optimistic mindset and expected the upcoming task to be a beneficial experience (Tenney et al., 2016). Moreover, by the end of the fellowship their narratives on the understanding of the MATPD project had evolved from a learning opportunity to an execution role of carrying out specific tasks such as conducting workshops to teachers and becoming a mentor to them.

Professional Development Experience

PD is an essential element for enhancing teachers' competence, quality and effectiveness (Ozdemir, 2013). Data were analysed under three themes while studying teachers' beliefs, attitudes, skills and knowledge (BASK) on PD experiences: importance of PD, skills and competencies required to be an effective teacher educator, and valuable forms of PD activities. Although threads of the findings weave together at baseline and endline data analysis, the PD Experiences data were analysed with respect to the fellows' experiences on PD and the fellowship.

For the study analysis PD experiences was defined as any practical contact of activities that facilitated in enhancing knowledge, skills and behaviour of teachers as well as any form of

observations that the fellows have made on the kind of activities that have been taking place within the teaching communities. The fellows believed that TPD is important and believed that teachers participate in a number of PD activities such as workshops, seminars, conferences and exchange programs. While these activities are believed to be important activities, the majority of the fellows participate in workshops in education related areas, observation visits to other schools and in the physical meetup of a network of teachers. These findings suggest that the teachers are engaging in activities that help them to develop their skills, knowledge, attitude and understanding of the importance of their career enhancement. These findings are consistent with Villegas-Reimers (2003) and Masuda et al., (2013). Teachers' engagement in high quality learning is crucial in teacher effectiveness. Similarly, it is through these engagements that teachers learn and exchange of knowledge takes place. In line with our findings, previous research indicates that the impact of PDs take place overtime, when teachers engage in sharing teaching practices through valuable forms of PD activities and learning communities (Laws et al., 2009).

For this study, fellowship is defined as a fellowship designed for teachers and teacher educators that was conducted in blended mode. Eight themes were analyzed based on fellowship experiences, namely, PD Experience, Mentoring, Action Research,Reflection, Collaboration, ICT, PLCs and GESI.

New and different experiences has been defined as any novel, unfamiliar knowledge, skills and behaviours that the fellows engaged in during the course of the fellowship. The analysis revealed the fellows had a preconceived understanding that PDs are one-off activities and the realisation that for effective teacher learning ongoing structured, content focused, from regular to informal discussions with other teachers on instruction techniques, local and international conferences, seminars short courses, mentoring, action research, peer observations and school visits (Ozdemir, 2013) to name a few.

In this theme, the challenging factor in fellowship is conceptualised as the hurdles and the roadblocks in executing the fellowship roles throughout the fellowship. Findings suggested that time constraints were the key factor in not being able to give commitment to the fellowship and to carry out the roles and responsibilities assigned to the fellows as majority of the fellows are actively engaged in teaching. Teaching is considered as a 24/7 job and teachers take on diverse responsibilities, and hence, miss out on the opportunities to transfer professional practices into enhancing students' learning in the form of action research. Such is the case of the fellowship for which the final output was to generate action research, which was a challenge due to time constraints (Wee, et al. 2007)

Individual identity is pivotal for self-improvement and sustainability as identity refers to the self-definition consisting of individual goals, values and beliefs which are aligned with things that individual is committed to attain (Pishghadam et al., 2022). Thus, in this study context, investigating how the fellows refer to themselves was explored. The findings revealed that fellows identified themselves based on their roles and responsibilities. Interestingly some fellows believed that they can become a mentor based on their experiences. One explanation for this is proposed by Pishghadam et al., (2022) in identity development framework which allows to discover how different aspects of teachers' professional identities process and how teacher identity impacts teaching practices.

Understanding of the connections between the different themes /ideas in the MATPD project suggests that the fellows were able to make several connections with what they have learnt in the fellowship. These include, use of ICT in the classroom, writing skills, action research, mentoring and reflection. The findings indicate that the fellowship was a success as fellows were able to make connections on the different core elements taught in the fellowship and the practicality of it leading to transfer of knowledge.

Action Research

Action research is a widely used approach for the continuous PD of teachers (Ponte, et al, 2004; Meirink et. al, 2010). The teacher-led nature of this type of PD enables teachers themselves to engage in reflective practices which they can use for the continuous improvement of their day-to-day practices inside their classrooms (Bevins, Jordan & Perry, 2011). With this intention, the SATE fellowship focused on conducting sessions on action research and other relevant aspects related to it such as ICT, reflection and so on.

The research aimed to identify any changes in the beliefs and attitudes of the fellows with regard to the learnings and experiences of action research during the fellowship and its implementation afterwards. There were no significant differences according to their beliefs and attitudes as even initially they had expressed that action research was an essential component that could cater to CPD. However, there had been a significant difference seen in the survey results in terms of familiarity with action research.

Considering their status of skills and knowledge, the fellows stated in the survey responses that they had gained skills, although there was not much of a significance difference between the baseline and the endline. Nevertheless, the experience to conduct action research within the fellowship had made them more confident in implementing it practically inside classrooms. Teachers sometimes feel reluctant to do action research as they feel it is a meticulous and a time-consuming task. Clark et al. (2020) describes action research to be very similar to the everyday tasks a teacher has to experience in the classroom and correlates with this teaching

cycle. The opportunities fellows had to conduct action research not only gave them the opportunity to learn and practise the skills and to let go of this fear, but also opened their eyes to the practical realities of implementing action research in the context of Maldives. Hence, it is very important that more opportunities of the sort are provided to teachers for their PD. Their confidence in the abilities gained were seen in comments such as '*have learnt how to deal with difficult situations in the action research process*', '*thinking of conducting action research in the future*' and '*definitely interested in applying community-based action research*'. These types of statements suggest that fellows will be applying the skills as they are now more thorough with the whole process after conducting action research. This is a rather important finding as fellows had not been so confident in expressing their familiarity at the baseline.

According to a research done by Kunlasomboon et al. (2014), engaging in conducting action research helps teachers to become eager to improve their own work and teachers take pride in doing so themselves. Even though the fellows had to engage in second-order action research as stated by Feldman (2023) for the fellowship, it facilitated them with becoming familiar with the action research processes through practical experience.

The lack of action research as a practice among Maldivian teachers define that there could be numerous challenges in doing so. Thus, the barriers were also explored from the perspective of these fellows.

One main concern highlighted by fellows was their heavy workload and limitation of time which had acted as a barrier to conducting the second cycle of their action research. Although it is considered a gap by the fellows here stating '*the first cycle worked well, but when it came to the second cycle teachers were less interested*', according to Oberschmidt et al. (2022), the definition of action research by experts varies, and the cyclical nature is just one of its key features. Thus, even one cycle becomes sufficient in understanding and addressing the contextual problems.

As reflection helps to understand the undermining issues and gaps, upon reflection, the fellows highlighted alternative approaches they could have adopted for their action research which also suggests their learnings from the experience. As such, a quote by a fellow says, '*… if I had selected all the teachers from the grade including the religious (Islam and Quran) subject teachers, my findings would have been much more strengthened'.*

The lack of interest in conducting Action research due to no established culture of research was a major challenge highlighted by fellows. They also believed that this has to be made mandatory for teachers based on the value it adds to their own personal and professional growth. The quote from a fellow '*That is because the whole school for example, teachers don't find people doing it. People working on action research, they don't see any such culture',* highlighting this

idea. Moreover, this is also stressed by saying that in order to develop such a culture, *'have kind of maybe a policy for the teachers'.*

Moreover, since action research is rarely practised by teachers in the schools, fellows have suggested having '*someone to lead this kind of thing'* and also *'maybe a group of teachers can collaborate and do it'.* This is a feasible venture in our context and is also advocated by Mertler (2020) stating that action research is a process whereby teachers work together to improve on their own practices. The collaborative and participative role is thus emphasised.

Mentoring

Fellows had good takeaways from the Fellowship training relating to mentoring. Their definitions of mentoring prior to the fellowship had been raised to a different level with the idea that it is '*really collaborative and sharing the experiences and good practices with each other, in a continuous manner'.* Thus, their understanding of mentoring is in line with the perspective of Sambunjak et al. (2010) that states that the relationship between mentor and mentor to be based on mutual interests and Hudson (2013) also stresses on the importance of two-way dialoguing in mentoring. The fellows' ideas of being supported and guided by a more experienced person in mentoring is also reinforced by McLaughlin (2010). Fellows also describe mentoring as a 'two-way street' to stress the collaborative nature of mentoring.

The fellows also were thorough with the idea that mentoring and monitoring were separate. All fellows had been mentored during their pre-service education although only some had had the privilege of being a mentor. They believed that mentoring was sometimes formal whereas it is informal at times where more casual conversations took place rather than the official and routine procedures at schools.

There was a remarkable change in the way PD of Teacher Educators were included as a benefit of mentoring. A fellow stated '*give a lot of insights and experience actually for the teacher educators because teacher educators also will be working with the teacher'.* This thought had not surfaced at the initial interviews and surveys done prior to the Fellowship.

Fellows have also shown their satisfaction of the knowledge and skills gained in mentoring during the Fellowship with their plans to use them in their schools in the future. This is seen in the comments as '*I will use it for the overall improvement of my school. That's what I have planned and it's what I'm doing also now, after this project'* There were also criticisms on the way TPD is conducted as one-off sessions with no follow up and mentoring was suggested as an alternative means to solving this issue. A study on understanding mentoring relationships has concluded that mentoring is a good way to develop and fine-tune teachers' professional identity formation (Venktaramana, 2023).

The most important skills of all they have learnt from the fellowship were stated as communication skills and listening skills. '*Be good listeners, willing to help them and things like that'* and '*And listen, listening, of course. because I interrupt, I just maybe break and then say something. But now I find myself, more a good listener*' were some of the comments from fellows. These are important skills that have been developed in the fellows with regard to mentoring and for TPD as a whole. Open communication and accessibility had been identified as one of the key components for successful mentoring by Eller, Lev and Feurer (2014) too.

A blended approach to mentoring was favoured by the fellows to be the most suitable in the Maldivian context for reasons such as '*really difficult due to the busy schedule'* and *'the blended mode, made it more flexible for us'.* Some of the fellows also had to travel during the fellowship for work purposes and thus, the blended approach adopted has been convenient in adapting to time differences across different time zones.

Although having two mentors had contributed to additional knowledge both content wise and contextually, fellows had to face some issues while being mentored by both. The two major challenges as highlighted by the fellows account to '*less coordination between both'* the Academic mentor and Field mentor and *'my academic mentor, she's actually quite busy'* which made it difficult to get timely feedback from the mentors. Nevertheless, these fellows from the MATPD project had not experienced other types of challenges such as transition difficulties, mismatched personalities, confidentiality breaches or mentor bias experienced in some other mentee-mentor relationships.

Relating to issues with regard to gender while mentoring, fellows had not highlighted any issues as such, except for one fellow who explained how her encounters with male staff had affected her confidence. According to her, '*So I kind of like sometimes even rehearse what I'm going to say to them in my mind before even approaching them*'

Reflection

Reflection is a critical practice not only in the field of education but in all professions. In SATE fellowship, where fellows were required to conduct an action research, reflection played an important role in identifying whether their interventions had worked, not worked, or needed improvement.

It was evident from the baseline interview that fellows understand the general concept of reflection and the majority of them reflect on their performance for their professional growth. Past studies have described reflection as a critical and effective practice in which teachers delve into a deeper understanding of their practices based on the pedagogical decisions they make, post evaluation of experiences, in order to improve those practices (Bevins, Jordan & Perry,

2011; Tripp & Rich, 2011). Similar to the description of reflection from literature, fellows have also defined reflection as an activity that *'think back' to be critical of our own practices'* in order to understand what could be improved. Interestingly, fellows highlighted that not only do they reflect on aspects that need improvement but also on methods that have worked as well. This indicates that teachers and teacher educators of Maldives are aware of the importance and concept of reflection to enhance their practices.

Although reflection is not practised formally in Maldivian educational institutes, it is practised informally by academics. Fellows have mentioned a range of activities they reflect on, for example; lesson planning, teaching strategies, classroom engagement and student feedback. Similar results emerged from the baseline survey. Most frequently engaged in reflected activities include reflecting on lessons after class, examining students' artefacts to understand whether an approach worked and analysing problems before choosing a solution. Contrary to these findings, there are certain reflective activities the majority of fellows never engage in, such as analysing video recordings of their own teaching to improve practice, visiting lessons of peers/colleagues to learn from them and requesting them to observe fellows' lessons to get feedback. In the Maldivian context these are not common practices and not all educational institutes may facilitate recording, despite it being found to be a very effective and powerful tool for reflecting on one's own teaching practices (Tripp & Rich, 2011). It is also possible that teachers or teacher educators feel hesitant to request their peers/colleagues to evaluate their work and give feedback due to the fear of being labelled as inadequate (Lamb, 2017). As reflection is not practised formally, there are no certain guidelines, instructions or frequency to practise reflection. Hence, academics are free to reflect on their own convenience using a method that works best for them. While a fellow mentioned *'I keep, not like a journal but on the phone' ,* others tend to just simply reflect without taking any notes *'not after every lesson but after many lessons we think about ways to improve'.*

According to Andrzej and Farrell (2021), reflective practices lead practitioners to be more conscious of their practices. In order to achieve this, frequent reflection is necessary. In the baseline interview fellows were asked about their frequency of engagement in reflective practices. Though many fellows mentioned that they reflect frequently, a few stated *'Rarely', 'not much', 'Very very less'*. These fellows explained further that this is due to their busy schedule, and they were working under pressure. Hence, they often forget to reflect and since reflection is not required by any policies, it seems reflection practices are not prioritised. This finding is not uncommon. Lack of time to reflect because of teachers' busy schedules (Chi, 2023; Otienoh, 2009) is a common issue among teachers and teacher educators.

Endline interview focused on the fellows' experience of reflection in the SATE fellowship. Fellows highlighted areas they have reflected on during their journey in the fellowship. For

instance, face-to-face and online sessions, how to conduct the action research and tools for data collection. Additionally, as part of action research they had reflection sessions with teachers. While some conducted these sessions face-to-face, others conducted them online because some fellows residing in the capital city selected teachers from outer islands. This means the TPD session will be conducted online as well. Hence, there may be differences in the effectiveness of reflection sessions as face-to-face discussions are found to be the most effective in encouraging reflection (Bevins, Jordan & Perry, 2011).

Luttenberg, Meijer and Oolbekkink-Marchand (2017) explained that '*reflection in action research can make the teacher aware of the different forms of knowledge and action in education, of the inherent tensions and contradictions, and of what is required to incite change on several levels'* (p.20). Although this is the primary purpose of reflections in action research, the purpose of fellows' reflective sessions with teachers slightly differs. They stated it was to ensure the interventions worked and whether the teachers were implementing it correctly. Their purpose seems valid as the action research conducted was collaborative, and considering that this is the first time that action research successfully completed with teachers in the Maldives. However subsequently, the ultimate goal of reflection indeed would be as explained by Luttenberg, Meijer and Oolbekkink-Marchand (2017). Fellows further mentioned that these reflection sessions benefitted both the teachers and themselves.

Fellows were also required to write weekly reflection journals. Unfortunately, though some fellows continued this practice for a few weeks, the majority of fellows did not attempt this. This was most likely due to time constraints and reflection through journals is also found to be challenging and time-consuming (Otienoh, 2009). It is important to highlight that the fellowship would be an additional work fellows had to incorporate into their busy schedules. Hence, it is unsurprising that reflective journaling did not work in this case. However, what is surprising is the significant shift observed in the frequency of fellows reflective practices at the end of the fellowship. This indicates that through the fellowship, fellows understood the value of engaging in reflective practice. Furthermore, fellowship was an opportunity for fellows to start reflecting again or enhance their reflection.

Social Learning

Through the SATE fellowship, this project aimed to develop collaborative professional learning groups for the fellows to engage (virtually) for their PD. The findings from interviews and surveys indicate that fellows engage in both formal and informal learning communities. As suggested by Stokes and Evans (2021), engagement in formal and informal learning experiences is essential for preservice and in-service teachers to acquire content knowledge, pedagogical skills, and self-efficacy, which are crucial for effective teaching. They further state that these

learning experiences include PD workshops, discipline-specific courses, research experiences, and internships, preservice teachers can gain hands-on experience with science activities, develop lesson plans, and learn effective classroom management strategies. These are in line with what has been suggested by the fellows, they mostly engage with colleagues from the workplace for their PD. These experiences collectively contribute to their confidence and ability to deliver engaging and impactful instruction.

Online collaboration can be a valuable way for fellows to share expertise and improve student learning. According to Mackey and Evans (2011), online PD communities allowed teachers to connect their experiences as learners and educators. These experiences indicate that online learning communities have significant potential to enhance PD for teachers within schools. To fully realise this potential, online courses should be redesigned to foster the creation of personal networks of practice among participants, both within and beyond the course structure. The findings of this study shows that most of the fellows engaged and collaborated in online professional communities. This is likely due to the fact that many fellows are dispersed all over the country.

The findings also suggest that asynchronous discussions on virtual platforms are a valuable way for fellows to participate in PLCs. This is consistent with the literature on asynchronous learning, which suggests that asynchronous learning can be an effective way for adult learners to engage in learning (Bailey, Hughes & Moore, 2003). Asynchronous learning can be particularly beneficial for teachers, who often have busy schedules and limited time for PD.

The findings of this study suggest that the membership of PLCs is influenced by the job profile of the participants. Fellows who work more closely with schools are more likely to be involved in subject-specific and theme-specific teacher/teacher-educator groups. This is likely due to the fact that these fellows have a greater need for collaboration and support in their specific areas of expertise. According to DuFour (2004), PLCs encompass various configurations of individuals committed to advancing education. These groups range from grade-level teaching teams to school committees, high school departments, entire school districts, state departments of education, and national professional organisations. Each of these entities serves as a hub for collaboration, fostering the exchange of knowledge, expertise, and best practices among educators.

According to the fellows, Subject-specific PLCs are beneficial for them as they provide a platform for them to delve into relevant subject-related topics and concerns. Literature on PLCs suggests that subject-specific PLCs can be an effective way for teachers to learn about new curricula, share best practices, and develop collaborative teaching strategies (DuFour, 2004; Hord, 2009). Some fellows view PLCs as a way to address administrative and logistical matters related to teaching. This suggests that PLCs can serve a variety of functions, not just PD. PLCs can also be a

forum for teachers to share resources, collaborate on lesson planning, and address common challenges.

Fellows from Maldives frequently maintained cross country interaction, especially those from Nepal. This is particularly true for the fellows who conducted action research on the same themes. Cross-country interactions began after the face-to-face sessions of the fellowship, even though the fellows had been attending online common webinars prior to that. Cross country interaction is a valuable tool for learning and PD (Evans, Furtak & Ivey, 2013). It can help people to develop new perspectives, understand different cultures, and develop new skills.

The study also found that the fellows interacted more with fellows from Nepal than with fellows from Afghanistan. This may be due to the fact that the fellows from Afghanistan were unable to participate in the face-to-face sessions. The face-to-face sessions seem to be particularly important in facilitating cross-country interaction. The literature also suggests that face-to-face interaction is particularly important for cross-cultural learning (Ely, Anderson & Thomas, 2003). This is because face-to-face interaction allows people to build trust, develop rapport, and communicate non-verbally. The SATE fellowship paved ways for the cross-country interaction which in turn has enhanced the engagement in the virtual learning communities.

Fellows actively engaged in capacity building and support groups, where best practices had been shared and issues related to teaching and learning were addressed. This is consistent with the literature on PLCs, which suggests that one of the key benefits of PLCs is that they provide a forum for teachers to share expertise and learn from each other (Alwafi, Downey & Kinchin, 2020). PLCs play a pivotal role in nurturing continuous PD, empowering educators to refine their pedagogical skills, enhance their teaching methodologies, and ultimately, elevate student learning outcomes (DuFour, 2004).

As mentioned by Botha and Nel (2022), PLCs can provide a structured environment for teachers to collaborate, share expertise, and engage in ongoing PD. This can be particularly beneficial for teachers in rural and remote areas, who may have limited access to traditional PD opportunities. This study highlights the challenges of providing equitable resources and support to all island schools in Maldives due to the geographical setup of the country. This study highlights the need for targeted strategies to address these disparities and ensure that all teachers, regardless of their location, have access to the resources and support they need to provide quality education for their students. The learning groups that have been formed are serving as a means to support schools with low resources. This suggests that PLCs can be an effective way to provide PD and support to teachers in rural and remote areas.

The findings of this study suggest that despite having access to Telegram groups, very few participants actively engage with others. This is a common challenge faced by many online

groups, as individuals may lack the motivation or incentive to participate actively. It just shows that Telegram is not a popular method in this country, however there are many other sources which can and are being utilized effectively. The findings highlight the need for effective strategies to encourage participation and foster meaningful interactions among group members in more commonly used social media platforms. However, the study also identifies several promising approaches to enhance engagement on Telegram groups:

Scenario-based Discussions and Thought-provoking Questions: Introducing scenarios and thought-provoking questions can stimulate discussions, encourage active participation, and promote the exchange of ideas among participants. These prompts can be introduced to specific topics or themes relevant to the group's focus. As proposed by Mamakli, Alimoglu and Daloğlu (2023), scenario based learning enhances students' group work and communication skills while fostering in-depth learning at a higher cognitive level.

Emphasising Participation from the Start: Clearly emphasising the importance of participation at the beginning of each session sets the tone for active engagement throughout the group's interactions. This can be done by explicitly stating the value of participation, acknowledging the contributions of active members, and encouraging all participants to share their perspectives.

Small Groups for Shared Interests: Forming small groups based on shared interests, such as principals, teachers, and teacher educators, can foster a more intimate and supportive environment for discussions. This approach allows participants to connect with individuals who have similar experiences and expertise, leading to more meaningful interactions.

Daily or Weekly Questions: Posing a daily or weekly question related to action research, mentoring, the use of ICT, or other relevant topics can provide a structured and focused platform for engagement. Requiring all participants to comment on these questions ensures that everyone is actively involved and contributes to the group's knowledge sharing.

Overall, the data suggests that fellows are actively engaged in PLCs. This is a positive finding, as PLCs have been shown to have a positive impact on student learning, teacher practice, and school culture.

Information and Communications Technology

The primary objective of this research is to evaluate the self-efficacy of fellows in utilising ICT, conducting action research, and providing mentorship for TPD . As highlighted by Jo Tondeur et al. (2016), modelling the use of technology for PD can significantly facilitate teachers' innovative use of technology in classrooms. This study aims to assess the extent of change in these competencies resulting from participants' engagement in the fellowship program.

The quantitative analysis conducted indicates a positive response in fellows' self-assessed confidence levels subsequent to their participation in the fellowship program. Proficiency in use of ICT in various domains, including ICT, action research skills, and mentoring capabilities for TPD, exhibited notable improvement post-fellowship. This finding resonates with prior research; for instance, Tondeur et al. (2017) illustrated a similar positive impact of technology-focused PD programs on teachers' self-efficacy in integrating technology in education. Furthermore, the work by Ertmer and Ottenbreit-Leftwich (2010) provides complementary insights into the development of teachers' competence in utilising technology and engaging in action research. The quantifiable metrics derived from this study underscore the substantial and favourable influence of the fellowship initiative on enhancing self-perceived proficiency across these essential educational domains.

Complementing the quantitative data, the qualitative findings in this study provide a nuanced comprehension of the fellows' experiences, adding depth to their self-assessed confidence levels post-fellowship. Despite the observable quantitative increase in confidence, the qualitative narratives reveal intricate complexities. This echoes the findings in studies such as Mishra and Koehler (2006), which elucidate the challenges educators face in integrating technology due to the nuanced nature of TPACK. The qualitative accounts from our research align with the notion that the application of theoretical knowledge into practical contexts remains a persistent challenge. Additionally, as discussed by Somekh and Zeichner (2009), the integration of technology and conducting action research often requires ongoing support and contextualization within specific teaching environments. The qualitative insights gathered from fellows underscore their ongoing struggles in effectively utilising advanced ICT tools and conducting in-depth action research, echoing the multifaceted nature of implementing theoretical learning into classroom practice.

The quantitative data, depicting an overall positive trend in self-assessed skill improvement among fellows, provides a generalised perspective. This finding resonates with research by Shulman (2005), emphasising the importance of self-assessment and the potential for perceived improvement in pedagogical skills following PD initiatives. However, the qualitative insights add depth by highlighting the individualised and nuanced nature of skill development, aligning with the research by Hativa and Goodyear (2002), which emphasizes the complexities in translating acquired knowledge into effective teaching practices.

The convergence of qualitative and quantitative findings generally supports the observed positive trend post-fellowship, yet discrepancies surface prominently within the qualitative insights. This aligns with research by Elen and Clarebout (2007), emphasizing the importance of triangulation in educational research to validate and complement diverse data sources. While the quantitative data suggest an overall enhancement in self-assessed proficiency, the

qualitative discrepancies shed light on potential gaps between perceived and actual practical skills. This echoes the findings of Kirschner, Sweller, and Clark (2006), highlighting the limitations of self-assessment in accurately gauging one's competence in complex tasks, such as applying technology in pedagogical contexts. The discrepancies underscore the necessity for a more nuanced evaluation methodology. Studies like that by Picciano (2012) advocate for mixed-method approaches that delve deeper into the intricacies of practical application, recognizing the multifaceted nature of evaluating skills and competencies in educational settings. This underscores the importance of integrating various assessment methods to capture the complex interplay between perceived proficiency and actual practical skills

The disparities between quantitative and qualitative data could be attributed to multifaceted factors, including diverse learning backgrounds and varying exposure to resources among participants. Research by Prensky (2001) and Warschauer (2006) underscores the impact of diverse learners' backgrounds on their technological competencies, emphasising the importance of acknowledging these differences in educational interventions. Moreover, the subjective nature of self-assessment, as highlighted by Falchikov and Goldfinch (2000), can contribute to discrepancies between perceived and actual proficiency levels. Addressing these discrepancies necessitates tailored support mechanisms and targeted interventions. Studies such as that by Weston and Bain (2010) emphasise the significance of personalised, context-specific interventions to bridge gaps in skill development among educators with diverse backgrounds. Furthermore, an improved evaluation framework, as advocated by Black and Wiliam (1998), should encompass multifaceted assessments that comprehensively gauge practical proficiency, considering not only self-assessment but also observed performance and contextual application within educational settings.

The amalgamation of quantitative and qualitative methodologies in this study yields comprehensive insights congruent with the research question. The quantitative data indicate an overarching positive shift in self-assessed skills among fellows, aligning with research by Tondeur et al. (2017), which emphasises the impact of PD programs on enhancing teachers' self-efficacy in ICT integration. However, the qualitative narratives reveal complexities in practical application, resonating with findings from Mishra and Koehler (2006) that underscore the challenges in translating theoretical knowledge into effective classroom practice. This disparity between self-assessment and practical application underscores the necessity for a more nuanced evaluation approach. Research by Ertmer and Ottenbreit-Leftwich (2010) advocates for comprehensive evaluation frameworks that consider diverse dimensions of teacher competence in technology integration. Moreover, targeted support strategies, as discussed by Weston and Bain (2010), are essential to bridge the gap between perceived and actual proficiency in ICT, action research, and mentoring for TPD (TPD). These strategies should

be tailored to address individualised needs and contextual challenges faced by the fellows, enhancing their capabilities in practical implementation.

The outcomes of our study have primarily centred on the pivotal role of ICT within the framework of our fellows' fellowship-related learning experiences. Through a diverse array of learning resources including webinars and classes, fellows have acquired a comprehensive understanding of ICT and its multifaceted applications in the classroom. This aligns with research by Tondeur et al. (2012), emphasising the importance of teachers' ICT integration competencies for effective classroom practices. The evident adoption of various tools and applications by the fellows signifies a proactive approach towards enhancing the interactivity and efficacy of their learning environments. This integration not only amplifies their existing instructional methods but also serves as a catalyst for future advancements in the ever-evolving landscape of education. Furthermore, the demonstrated adeptness in ICT integration by the fellows underscores its pivotal role in shaping the future landscape of teaching and learning methodologies. Research by Voogt et al. (2013) corroborates this, highlighting the potential of ICT to transform pedagogical approaches and redefine educational practices. The enthusiasm and proficiency displayed by the fellows in embracing ICT strongly suggest its indispensable role in shaping the trajectory of education, serving as a valuable tool to steer the course of teaching and learning practices toward innovation and dynamism.

Collaboration

Sturko and Gregson (2008) believe that collaborative practices for PD are essential for improvement in practices. Furthermore, opportunities for collaborative PD is an effective path for positive changes in teachers' belief and practice (Kelly & Cherkowski, 2015). During the baseline interview, fellows have shared their experiences of collaborative practices and their attitude towards collaboration. Fellows have described collaborative experiences as '*helps to identify problems and gather ideas*' and some fellows felt that collaboration had saved time and helped them to work more effectively. These experiences are inline with the idea of Starman et al, (2014) and Poekert (2012).

Findings show that the most common form of collaboration is discussion with colleagues where academics share their experiences and discuss teaching methods, topics and areas of improvement. These findings from the baseline interview are in agreement with baseline survey findings as well. Discussing teaching problems and what is important in education is one of the most frequently engaged collaborative activities. These collaborative practices fall to the 'sharing' collaborative activities category identified by De Jong, Meirink and Admiraal (2022), and thus, further highlights that teachers' BASK contribute to this category. Additionally, although Avalos-Bevan & Bascope (2017), consider that 'preparing lessons with other

colleagues' as essential collaborative activity, the baseline survey found preparing lessons with other colleagues as a less frequently engaged activity. A possible reason for this may be that collaborative lesson planning is not supported sufficiently from management, rather it is done individually. In comparison, the frequency of engagement in collaborative activities pre and post the fellowship showed no significant difference. This further confirms the lack of support. Hence, there is a need to create a culture that supports collaboration since it is a factor that enhances teachers' collaboration (De Jong, Meirink & Admiraal, 2022).

During the collaborative action research fellows conducted, they highlighted activities they did collaboratively with teachers. For instance, they had discussion sessions with teachers to generate ideas and in the design and planning process of action research. These collaborations were conducted both online and physically. It is noteworthy that these collaborations were labelled as '*mentoring*' as well, since fellows mentored the teachers and fellows were mentored by an academic and field mentor. These collaborations enabled a better understanding of process, models and concepts used in the action research, reflecting together, PD, and moving from working individually to collaboratively (Castro Garcés, A. Y., & Martínez Granada, 2016).

Gender Equality and Social Inclusion

Prior to the fellowship, fellows' understanding of inclusion includes people from all backgrounds, accepting individual differences and knowing that everyone has an equal opportunity for quality education. Interestingly, findings from endline interviews indicate that teachers had very little experience dealing with students from diverse religious backgrounds, ethnicity and race. This implies that teachers need to be more aware of the gender inequality, socioeconomic backgrounds and differently abled students. Thomas and Loxley (2001) suggest that fostering an inclusive ethos requires educators to embrace diversity in all its forms, including cultural, linguistic, and cognitive differences.

Findings revealed that teachers face numerous challenges in addressing inclusion within classroom settings, including planning activities for diverse student needs, accessing resources tailored to different learning abilities, and managing large class sizes. These findings signal the need for capacity building and the need for a structured PD training for preservice and in service teachers. Additional challenges are posed to teachers as teaching is a female dominated field. This is reflected in fellows' efforts to select teachers for their action research; eg: selecting an equal number of males and females teachers for the action research was a daunting task. Although efforts to address gender disparities in teacher participation are crucial for promoting equity and diversity in educational research initiatives (Heward, 2006) , this was not possible. Thus, fellows decided to select teachers based on a selection criteria. For instance, teachers who were teaching subject matters related to the topic of Action research at hand, teachers

who are familiar with project based learning were considered. Additionally, depending on teacher ratio, female: male. Priority was given if there were males who fit the criteria. Taking into consideration the selection criteria, however, there was an incidence where the male participant was not very responsive to carry out Action Research. Research by Heward (2006) suggests that teacher selection criteria for research projects should consider not only subject expertise but also the willingness and ability to implement innovative practices in the classroom.

Observational findings during classroom teaching highlight not all teachers practise inclusivity, for instance, some teachers focus on more vocal students and neglected silent students. This behaviour signals the need for PD sessions on inclusivity as most teachers do these unconsciously given the circumstance in the classroom. This behaviour on the teacher's part directs the need for PD sessions on classroom management. Furthermore, the study findings also revealed that although teachers believed they engage in inclusive pedagogical practices in classrooms, their knowledge of implementing such practices were limited to group activities, changing seats in group formation, using reinforcements and so on. There were several reasons for these practices as there are no separate schools to cater to differently abled students, and teachers are forced to include the diverse learners into a single classroom. Studies indicate that adoption of inclusive pedagogical practices, such as collaborative learning, differentiated tasks, and flexible grouping strategies, are practices that align with the principles of Universal Design for Learning (UDL) and emphasize the importance of catering to diverse student abilities and preferences (Rose & Meyer, 2002). The findings of the study revealed that Maldivian teachers need capacity building training to continue engaging in inclusive teaching and learning practices effectively.

Section V: IMPLICATIONS AND CONCLUSION

Implications for Teacher Professional Development in Maldives

The BASK study reveals that TPD initiatives should prioritise building teachers' capacity to address the gaps in teaching and learning needs within the classroom. Teachers need to be trained to be equipped with resources, teaching strategies to deliver pedagogical content and to cater to diverse learners. Thus, TPDs should be tailored to the specific needs and contexts of Maldivian teachers, incorporating local cultural perspectives and realities. The following are some of the areas for TPDs identified from the BASK study and the implications of the findings on each specific area within the MATPD project.

Action Research

As per the situation of Action research in the country, teachers, though they have an understanding of action research, are reluctant to engage in action research due to various reasons. Among the most important are not having sufficient knowledge and the other is the time factor. Through the SATE fellowship teachers and teacher educators came to know the importance of action research for sustainable TPD as there is no other way that can help one improve one’s own practices other than by action research.

This implies that there is a dire need for action research to be incorporated into the school system and for it to be made mandatory for teachers so that they could use it as a means to solve their contextual problems, which might not be available from other readings or PD sessions taken by experts from outside their own school contexts.

Mentoring

The findings from the BASK study concludes that mentoring is practised in schools in informal ways. Sadly, it is rarely a two-way communication that goes on between mentors and mentees as the mentor mostly demonstrates a more authoritative role in mentoring. Therefore, the Fellowship had taught them the actual ways in which mentoring has to be organised and conducted. Learnings from the study imply that mentoring is an essential component for both psycho-social support and well being of the teachers as well as that of pedagogical support. The most significant of it was how mentoring could be attached to inculcating a tradition of action research in our school communities.

Therefore, it is important to formalise the mentoring processes in schools and use mentoring to enhance teaching and learning in every way, including engaging in action research and reflecting

on their work. The study also implies the role of field mentors who could be the senior management of their schools who have an equal understanding of the problems eminent in their schools.

Reflection

The fact that fellows have a clear understanding of reflection and reflect frequently implies fellows' awareness on the importance and effectiveness of reflection. Reflection is a common practice, however, not formalised in the Maldivian education system. These findings on reflective practices have significant implications for teacher educators, teachers, educational leaders and policy makers. It is important to implement structured, more formal approaches of reflective sessions in their practices and to integrate reflective practice into teachers training and PD. It was evident that the fellows workload and busy schedule, to a great extent, forces them to prioritise other work over allocating time specifically for reflection. This implies that opportunities and time need to be allocated for them to effectively reflect on their practices.

During the fellowship, fellows got the opportunity to reflect and write on a reflection journal on courses, enrichment sessions and most importantly the action research they conducted. According to the fellows, the reflective discussion sessions they had with teachers were effective. Additionally, at the end of the fellowship there was a significant increase in the engagement of reflective practices. This implies the importance and effectiveness of providing structured opportunities for reflection.

Social Learning

Several Implications can be drawn regarding the participation of fellows in PLCs and their engagement in PD activities. The findings from the BASK study shows that fellows engage in a variety of formal and informal PLCs, both online and offline, including local and international groups. Hence, it is important to encourage fellows to continue participating in a variety of PLCs to benefit from diverse perspectives and experiences.

The fellows who worked closely with schools participated more in subject-specific and theme-specific PLCs, implying that there is a need to foster the development of subject-specific and theme-specific PLCs to cater to the needs and interests of educators.

It was evident that fellows have actively shared their action research findings with various audiences, including colleagues, students and other stakeholders, implying to encourage fellows to continue sharing their research findings to promote knowledge exchange and best practices in education.

Some fellows exhibited passive engagement in online platforms mainly due to time constraints. This indicates the need for incorporating strategies to enhance active participation, such as sharing thought provoking questions, facilitating small group discussions, and implementing interactive activities to foster greater participation and collaboration among fellows.

Information and Communications Technology

The findings suggest the importance of having collaborative initiatives in TPD programs in the Maldives. Encouraging collaboration among educators, educational institutions, and relevant stakeholders can facilitate the sharing of best practices, resources, and experiences in integrating ICT into teaching practices. Collaborative efforts can also foster a supportive community of practice where educators can learn from each other and collectively address challenges related to ICT integration.

The nuances revealed in the qualitative data underscore the need for tailored support mechanisms in TPD programs. Recognizing the diverse learning backgrounds and varying levels of exposure to resources among educators, TPD initiatives should offer personalised support tailored to individual needs. This could include differentiated PD pathways, mentorship programs, and ongoing coaching to address specific areas of improvement identified through self-assessment and practical application.

The successful integration of ICT by fellows highlights scalable and sustainable approaches that can be replicated in broader TPD initiatives across the Maldives. TPD programs should focus on scalable models that can be adapted to different contexts and educational settings while ensuring long-term sustainability. This may involve leveraging digital platforms for online learning and collaboration, developing open educational resources (OER), and establishing partnerships with local and international organisations to support capacity-building efforts.

The findings call for policy implications that prioritise the integration of ICT competencies in TPD frameworks in the Maldives. Policy-makers should consider incorporating ICT-related competencies and PD opportunities into teacher certification and licensure requirements. Additionally, policies should support the allocation of resources for ICT infrastructure, teacher training, and ongoing PD to ensure sustained progress in enhancing ICT integration in education.

Finally, the findings highlight the importance of ongoing research and evaluation to inform TPD practices in the Maldives. Continuous monitoring and evaluation of TPD initiatives can provide valuable insights into their effectiveness, identify areas for improvement, and guide future interventions. Collaborative research partnerships between educational institutions, government agencies, and international organisations can contribute to evidence-based decision-making and enhance the quality of TPD programs.

By considering these implications, TPD initiatives in the Maldives can be strengthened to effectively support educators in integrating ICT into teaching practices, ultimately enhancing the quality of education and preparing students for success in the digital age.

Collaboration

The findings related to collaborative practices shed light on the positive attitude of fellows towards collaboration and on collaborative activities they often engage in. This includes mostly sharing of experiences and teaching methods or areas of improvement. Moreover, findings show that a lot of collaboration took place during the implementation of fellows' action research, between the fellows, mentors and teachers. Through these collaborations they were able to come up with solutions and reflect on what needs to be improved. This implies that through collaboration teachers and teacher educators have the opportunity to bring positive changes to the education system.

These findings suggest several practical implications for educational stakeholders. In that regard, school leaders could provide opportunity, time and support for teachers to engage in collaborative activities. For instance, this could be achieved by engaging in PLCs, and in conducting collaborative research. Additionally, teachers could be encouraged towards collaborative lesson planning, which is found to be one of the least engaged collaborative activities, as it may lead to improved student achievement and satisfaction.

Gender Equality and Social Inclusion

Based on the study findings, it can be concluded that there is a greater need for inclusivity in Maldivian schools. Even though teachers understand the concept of inclusivity, they have little to limited experience in dealing with students from diverse backgrounds, ethnicity, religion and differently abled students. Teachers also find it challenging to address inclusion due lack of resources, time, knowledge and skills to cater to students' individual differences. Hence, it may be beneficial to invest in infrastructure, resources, and ongoing support systems for teachers. The study also highlights the lack of equal gender representation as an alarming finding as some schools had very few male teachers whereas in other schools male teachers were almost nonexistent. Efforts should be made to address gender disparities in teacher representation and recruitment.

This study serves as a stepping stone for aligning TPD initiatives to needs-based ongoing continuous training. It also has implications for policy makers to implement policies on conducting structured PDs that are sustainable as teachers would benefit from such planned PD training compared to one off training. This will also ensure long term impact and effective use of the skills and knowledge learned in PD sessions into classroom practices. Furthermore, the

study has implications for stakeholders, policy makers and teacher educators to design PDs with scalability in mind, allowing for adaptation and expansion to reach a broader audience of educators across the Maldives. As Maldives is an archipelago, scalability will be beneficial as schools in the island have different needs based on their location and accessibility. Additionally, TPD initiatives should be supported by supportive policy frameworks that prioritise inclusion, diversity, and equity in education. Policymakers should allocate resources and funding for TPD programs that address the specific needs of Maldivian teachers and students. Policies should support institutionalising inclusive practices within the education system and ensuring that TPD efforts are aligned with broader educational goals and priorities.

Conclusion

This study conducted to understand the beliefs, attitudes, skills and knowledge of research educators towards teacher professional development revealed interest in the change in Beliefs, Attitudes, Skills and Knowledge of the fellows who participated in the fellowship. The baseline and the endline data served this purpose. The baseline data was taken prior to fellows' engagement in the fellowship. This was to understand their beliefs, attributes, skills and knowledge on the areas focused on the fellowship training. Quantitative and qualitative data were collected to enhance the understanding of study. The baseline data revealed that fellows had somewhat mixed attitudes, limited knowledge and understanding on concepts like the project, action research, mentoring and use of learning communities. They also had different mindsets on the use of ICT in the classroom and inclusion. However, after the fellowship the endline findings revealed a shift in their beliefs, attitudes, skills and knowledge on all areas that were covered in the fellowship training. Additionally, fellows had developed the efficacy to conduct action research and engaged in mentoring, as they had the chance to experience the role of being a mentee during the fellowship process. For the comparison of baseline data with endline data, quantitative and qualitative data were collected for endline findings. This was to generate comprehensive findings that would facilitate in making informed conclusions, as the policymakers and educators can develop more comprehensive strategies for promoting equitable learning opportunities for all students. The findings indicate that TPD in the Maldives should focus on training teachers for collaboration, conduct action research, engage in mentoring; and develop knowledge of inclusive pedagogical and teaching practices. The TPDs should be designed with scalability in mind for sustainability, and policy support. By investing in TPD initiatives that address these key areas, the Maldives can foster good practices for sustainable quality education that caters all students with the opportunity to succeed.

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Appendices

Appendix A

Profile of Fellows

FELLOWS: PROFILE						
Fellow	**Gender**	**Profession**	**Qualification**	**Atoll**	**Province**	**Disability**
F1	F	Teacher Educator	Ph.D in Philosophy. B.A. in Educational Planning and Management	Kaafu	North Central	No
F2	F	Teacher Educator	Ph.D in Philosophy M.Sc. in Education Management	Kaafu	North Central	No
F3	F	Leading Teacher	M.A. in Education. Bachelor of Arts in Teaching English As Foreign Language	Kaafu	North Central	No
F4	F	Teacher Educator	M.Ed. B. Ed. - English	Kaafu	North Central	No
F5	F	Teacher Educator	Post -Graduate Certificate of Teaching in Higher Education (PGCTHE) ongoing. B.A. in Teaching English as a Foreign Language.	Kaafu	North Central	No
F6	F	Teacher Educator	M.Ed. (Curriculum and Instruction). B.Sc. (Chemistry, Botany, Zoology)	Kaafu	North Central	No
F7	F	Teacher Educator	M.Ed. in Management and Leader. B.A. in Teaching English as a Foreign Language	Kaafu	North Central	No
F8	F	Education Administration	M.A. in Education. Postgraduate Diploma in Educational Leadership,	Kaafu	North Central	No
F9	M	Deputy	M.Ed.	Kaafu	North	No

		Principal/ Teacher Educator	Bachelor of Teaching Secondary		Central	
F10	M	Leading Teacher	M.Ed. Education Management and Leadership. Bachelor of Teaching Secondary.	Kaafu	North Central	No
F11	F	School Principal	Ph.D of Philosophy. M.Ed. Leadership and Management. Master in Research Studies.	Alif Alif	North Central	No
F12	M	School Principal/ Teacher Educator	M.Ed. Bachelor of Teaching Secondary.	Raa	North	No
F13	M	Teacher Educator	Ph.D of Philosophy -Education M.Ed. Bachelor of Teaching Secondary	Haa Dhaalu	Upper North	No
F14	M	Leading Teacher/ Teacher Educator.	M.A. in Education Bachelor of Education-Educational Administration	Laamu	South Central	No
F15	F	School Principal	Ph.D of Philosophy -Education M.Ed. -Management. B. Ed.	Seenu	South	No

Appendix B

List of Enrichment Sessions

	Enrichment Sessions	Date
1	Using technologies for constructive teaching and learning. Sync 1	*24th May 2022*
2	Fact sheet	*7th June 2022*
3	Academic writing	*7th June 2022*
4	Using technologies for constructive teaching and learning. Sync 1	*9th June 2022*
5	Mentoring For teacher professional development	*21st June 2022*
6	Designing surveys, interviews and classroom observations	*30th July 2022*
7	Insight from Literature review and Classroom Observation	*3rd August 2022*
8	Analyzing advantages and limitations of a resource	*10th August 2022*
9	Establishing rapport with teachers	*17th August 2022*
10	Lesson Plan as a tool for Reflection	*24th August 2022*
11	Working with teachers: How to capture experiences	*7th September 2022*
12	Data collection, Management	*2nd November 2022*
13	Inclusion in Action Research	*23rd November 2022*
14	Action Research Report Template Discussion	*30th November 2022*

Appendix C

Baseline and Endline Interview

Baseline Interview

1. *What is your understanding of the MATPD project and your role within it?*

2. *As a teacher educator/teacher-how will you use the learnings from the fellowship in your practice and in mentoring teachers?*

3. *Why do you think professional development of teacher educators is important?*
   (a) In your opinion, what are some of the key skills and competencies required to be an effective teacher educator?
   (b) How do you think the meaningful use of ICT can help enhance/strengthen the professional development of teacher educators?
   (c) How do you think mentoring can help enhance/strengthen the professional development of teacher educators?
   (d) How do you think Action Research can help enhance/strengthen the professional development of teacher educators?

4. *What type of professional development activities have you been part of in the last 5 years as a teacher educator/teacher? Did this include any trainings on Action Research, Mentoring and ICT? What were the components of these training sessions?*
   (probe: courses/workshops/seminars/conferences/reading literature/online or face to face meet-ups with teachers/teacher educators, exchange programs/observation visits to other schools/teacher education institutes etc.)
   (a) Describe your experience and learning?
   (b) What has been the most valuable form of professional development for you and why?
   (c) Was there something that you remember changing about your practice/something you did differently in your teaching after this professional learning experience?
   (d) Please enlist some of the areas where you require professional development.

5. *(a) What does Action Research mean to you ?*
   (b) How do you think it can help address local contextual educational problems of teachers?

6. *(a) What does Mentoring mean to you ?*
   (b) Reflect on any experiences you have had of mentoring or being mentored.
   - *How did this benefit you as a mentor or a mentee?*
   - *Was this a structured mentoring process (by government/school management/any other institution or organization) OR was this an informal mentoring session (by head teacher/other experienced teachers/teacher educators)*

7. *Are you part of any group for discussing educational issues/teaching learning for enhancing your own professional development? Are these:*
   (a) Physical meetups/online spaces? (probe: what online spaces-whatsapp, telegram , social media groups etc, how many people are part of the community)
   (b) Formal spaces-Formal mentoring program in place by government/school management/any other institution or organization)
   (c) Informal spaces-Informal sessions by head teacher/other teachers/teacher educator
   (d) What kind of activities/discussion take place in the/these group
   (e) Frequency of engagement.
   (f) In what ways has engagement in the group helped you in improving your practice?
   (g) Have you faced any challenges being part of the group?

8. *(Part A) What are the different modes of distance teaching that are used for professional development of teacher educators/teachers (teacher training)?*
   (Part B) What has your experience been of using ICT for
   (a) professional development activities (training of teachers)
   (b) constructive teaching-learning in the classrooms?
   (Probe:)
   - *tools used: only devices OR*
   - *apps like zoom, google meet etc. OR*
   - *high order applications/means like geogebra, kahoot, simulations etc.- aware/not aware of the tools)/ aware but not received any training)/received training on these but do not have resources or school support to use these in classrooms) OR*
   - *Any other tools used*

   (c)How useful were these in your practice? Did you face any challenges in using ICT?

9. *Give an example of any activity in which you collaborated with a teacher/ teacher educator? What did you learn from the experience? what will change in process/ interaction if you get a chance to collaborate again?*

10. *What is the role of reflection in improving one's professional practice? How often do you get a chance to reflect on your practice? Give an example of an activity that was useful in promoting reflection on the practice? How do you engage your students/ student teachers in reflection on their learning?*

Endline Interview

Understanding of MATPD

This section focuses on understanding fellows' role in the SATE fellowship.

1. *Now that you have completed the SATE fellowship, what do you think was your role within the MATPD Project?*

Teacher Professional Development

This section focuses on fellows' learnings and experiences of the fellowship with respect to TPD. Questions are related to TPD experiences, teacher learning and collaboration.

1. *What were the main aspects of the fellowship that were different for you? Please give examples.*

2. *Which aspects of the fellowship were challenging for you? Please give examples.*

3. *(a) How do you think teachers learn?*
   (b) Has there been any change in your thinking about teacher learning during the fellowship? Explain what and how?

4. *(a) In your opinion, what are some of the key skills and competencies required to be an effective teacher educator?*
   (b) Do you identify yourself as a teacher educator? Please give reasons.

5. *Can you identify connections between fellowship and the different components that you were trained upon?*

Action Research

This section focuses on fellows' understanding and experiences of conducting practice-based Action Research with teachers. Questions are related to experiences of carrying out AR, teacher participation & collaboration and conducting AR post-fellowship.

1. *How was your experience of doing action research?*

(a) What new techniques and strategies of AR did you learn?
(b) What components of the fellowship helped in conducting AR? (probe: if the fellow has had any previous experience of action research, ask him/her how this experience was different, what kind of knowledge - teaching of science / maths/other subjects?)

2. *How do you think Action Research can help strengthen the professional development of teacher educators?*

3. *Please describe details of your work with the teachers for your Action Research.*
   (a) Activities that were done collaboratively versus those that were individually driven
   (b) Adjustments that both you and teachers made to conduct Action Research
   (c) What was the attitude of the teachers in the beginning and at the end of the Action Research? Please give examples.
   (d)Methods used to encourage/motivate teachers to participate and conduct Action Research
   (e) What kind of TPD workshop did you design for the teachers that participated in your action research study? (probe: workshop, workshop days, mode of workshop, tasks/concepts/pedagogy discussed in the workshop)
   (f) Can you describe how the teachers implemented Action Research in the classroom?
   (g) What did you change in the second cycle based on reflection and feedback of the 1st cycle?
   (h) Were there any differences in the way different teachers implemented the intervention?
   (i) Challenges faced in working with teachers and solutions to resolve the issues faced

4. *(a) Do you think your Action Research intervention worked well? If yes, please give reasons.*
   (b) Do you think there were any gaps/any aspects did not work well? If yes, please give examples.

5. *Do you have any idea or any area where you intend to use Action Research in the immediate future? If yes, can you elaborate on it?*

6. *(a) What do you believe are the challenges that may prevent you /other teachers & teacher educators from engaging in action research as a routine part of their professional practice?*
   (b) What do you think are some of the support mechanisms you need to make it part of your regular practice?

<u>Mentoring</u>

This section focuses on fellows' conception of mentoring, their learnings and experiences of the mentoring process, both as a mentee and a mentor.

1. *How has your understanding of "mentoring" changed post the fellowship? Do you think mentoring is different from "monitoring"? If yes, how?*

2. *How do you think mentoring can help strengthen the professional development of teacher educators?*

3. *How will you use the learnings from the fellowship in mentoring teachers for their professional development?*

4. *What are the different skills and qualities you have acquired during the fellowship to be an effective mentor?*
   (Probe: to answer this question, please think about the mentoring course, your AM-FM interactions and your experience of mentoring the teachers for the Action Research study?)

5. *Based on your experiences of being mentored, how different/useful was the blended mode of mentoring? (probe: in-person versus online (zoom) did language pose as a barrier for mentoring; if yes, then how?)*

6. *Has gender & seniority (experience) in any way impacted you as a mentee or in your role as a mentor to the teachers? (probe: easy/difficult to work with same gender/opp gender mentors/teachers)*

7. ***Role as a mentee*** *(being mentored by academic & field mentor)*
   (a) *How often did you communicate with your (a) academic mentor and (b) field mentor? (probe: monthly frequency, if frequency of communication has been low, then why?).*
   (b) *What suggestions given by your (a) academic mentor (b) field mentor have been critical in shaping your action research study? Please give examples. (probe: resources, ideas & strategy, contextualization, data, report writing, decision-making, did AM give any readings etc.)*
   (c) *Has mentoring by AM & FM helped you in working effectively with the teachers for your action research study? If yes, please give examples.*
   (d) *What problems did you face while working with your mentors? What further support would you have liked from them during the fellowship?*
   (e) *What have been the advantages and challenges of having two mentors (academic and field mentor) and why? Please give examples.*

8. ***Role as a mentor*** *(mentoring participating teachers for action research)*
   (a) *How often did you communicate with the teachers you mentored in your action research study? (monthly frequency and mode (online/offline/both)*

(b) *What kind of support/assistance did you provide to your mentee teachers? Please give examples. (probe: resources, ideas & strategy, contextualization, classroom implementation, lesson plan, etc.)*
(c) *Can you give examples of suggestions the teachers found helpful in implementing Action Research in the classroom?*
(d) *If you were to mentor your mentee again, what would you do differently and why?*

9. *Describe the mentoring model/process that will work in your country context?*

Social Learning

This section focuses on understanding the nature of interaction amongst MATPD fellows and how these interactions have helped the fellows in their PD.

1. *(a) Did you connect with any MATPD fellow within the country and across countries?*
   (b) Do you plan to continue these interactions beyond the fellowship? If yes, In what ways?

2. *(a) How did you engage in MATPD telegram groups, webinars, course related discussion forums?*
   (b) did you get an opportunity to learn from other MATPD fellows?
   (c) Did you face any challenges/difficulties while participating in these MATPD Telegram groups? If yes, please describe.

3. *How have you shared your action research experiences and learnings with other people? (probe: teachers/teacher educators/government officials etc.)*

4. *What platforms did you use to communicate with teachers for your action research study? What kind of discussion happened in these groups and how did they benefit the teachers? (probe use framework - whether it was used for administrative purpose or academic discussion on content and pedagogy through different modes - online/offline/calls/emails. Administrative : was the group used for giving information, direction, deciding about the dates etc.; Academic discussion: discussion about the content, the kind of misconceptions the students have about the content, pedagogic approaches and resources)*

5. *Were you part of any informal group with the MATPD fellows apart from the groups formed by the CORE MATPD team? If yes, what is the nature of interactions within these groups? What was the group used for? (probe: online/offline/calls/emails. Administrative : was the group used for giving information, direction, deciding about the dates etc.; Academic discussion: discussion about the content, the kind of misconceptions the students have about the content, pedagogic approaches and resources).*

6. *What should be done differently to increase participation and engagement of people (fellows/ teachers) in chat groups for future projects/collaborations?*

7. *Give an example of any activity in which you collaborated with a teacher/ teacher educator during the course of the fellowship for your professional development? What did you learn from the experience?*

Reflection

This section relates to reflective practices learnt and adopted by the fellows after the SATE Fellowship.

1. *What is the role of reflection in improving one's professional practice?*

2. *(a) Have you reflected upon the different components of the fellowship and how has this been useful to you (probe: courses, action research, enrichment webinar sessions, writing etc)?*

ICT

This section focuses on understanding what the fellows learnt about ICT during the fellowship through courses, webinars, etc. and in what ways did they use these learnings

1. *How do you think the meaningful use of ICT can help strengthen the professional development of teacher educators?*

2. *For your own professional development, what are the different types of digital tools/applications that you have used in this fellowship? Were any of these new for you? Did you face any challenges while using these? Please give examples.*
   (Probe: action research, training teachers, mentoring, classroom teaching etc.)?

3. *(a) What are the different types of digital tools/applications that you have used in the classroom or for training teachers during the fellowship?*
   (b) What kind of challenges did you face while using these? (Probe: action research, training teachers, mentoring, classroom teaching etc.)? Please give examples.

4. *(a) Can you give an example of how you will combine content, teaching approaches and technology for a lesson that you teach?*
   (b) Please state why you have selected this particular technology and how will you integrate it for meaningful teaching-learning to take place?

5. *Do you think you will continue using and exploring ICT in your practice? If yes, in what ways?*

6. *Based on your experiences after the fellowship, how relevant are blended approaches for effective TPD in your context?*

<u>Gender equality and social inclusion (GESI)</u>

This section focuses on understanding fellows perception of inclusion and diversity in their country-context and how these operate in their classrooms. We want to understand the various ways in which fellows have dealt with gender and inclusion-related issues in their AR.

1. *What is your understanding of the term 'inclusion' in your context/country?*

2. *(a) What kind of diversity have you seen in your teaching experiences?*
   (probe: social-gender, class & caste, minority and other ethnic groups, physical disability, and learning disability)
   (b) What are the challenges in addressing diversity?

3. *AR & GESI*

   (A) Selection of teachers

   - *What was your criteria for selecting teachers for your Action Research study? (probe: gender, different social groups, disability?-probe reasons)*
   - *How many male and female teachers participated in your AR? (probe: if they mention that they worked with only male/female teachers-ask why?*

   (B) Classroom Observation

   - *What kind of inclusion/exclusion did you notice when you first observed the classrooms, prior to the implementation of the intervention? (probe: social-gender, class & caste, minority and other ethnic groups, physical disability, and learning disability)*

   (C) Classroom Implementation

   - *What kind of teaching-learning practices did you include in your AR to make the classroom more inclusive for the learners?*

Appendix D

Code Books

Baseline Interview

THEMES	CODES	CODE DESCRIPTION
Theme 1	**MATPD**	
1	MATPD-UN	Understanding of the MATPD Project
2	MATPD-ROLE	Role of the fellows/FMs in the MATPD Project
3	MATPD-LEARN	Application of MATPD project learnings into one's own practice/area of work
Theme 2	**PROFESSIONAL DEVELOPMENT OF TEACHER EDUCATORS (PDTE)**	
1	PDTE-IMP	Importance of professional development of teacher educators
2	PDTE-SKILLS	Key skills and competencies required to be an effective teacher educator
3	PDTE-GEN	General details/scenario regarding professional development of teacher educators in the country
4	PDTE-CLMG	Training /professional development on classroom management for teacher educators
5	PDTE-AR	Action Research to enhance/strengthen the professional development of teacher educators
6	PDTE-MENT	Mentoring to enhance/strengthen the professional development of teacher educators
7	PDTE-ICT	Meaningful use of ICT to enhance/strengthen the professional development of teacher educators
8	PDTE-CON	Training /professional development on content for teacher educators
9	PDTE-PED	Training /professional development on pedagogy for teacher educators
10	PDTE-CEN	Training /professional development on 21st century skills for teacher educators
11	PDTE-OTHER	Training /professional development on any other theme/topic for teacher educators
12	PD-NEED	Area where professional development is needed
Theme 3	**PROFESSIONAL DEVELOPMENT OF SELF (SEPD)**	
1	SEPD-EXP	Experience of being part of various PD activities
2	SEPD-TYPE	Listing/names of various PD activities
3	SEPD-GOVT	PD programs were conducted by the government

4	*SEPD-PRIVATE*	*PD programs were conducted by the private sector*
5	*SEPD-CON*	*PD on subject related content*
6	*SEPD--PED*	*PD on subject related pedagogy*
7	*SEPD-CLMG*	*PD on classroom management*
8	*SEPD-CEN*	*PD on 21st Century Skills*
9	*SEPD-CHI*	*PD on child rights, child protection, child development, child psychology*
10	*SEPD-AR*	*PD on Action Research*
11	*SEPD-MENT*	*PD on Mentoring*
12	*SEPD-ICT*	*Respondent is talking about his/her professional development related to ICT*
13	*SEPD-OTHER*	*PD on another topic/theme*
14	*SEPD-TL*	*Implementing knowledge/skills etc. from trainings/professional development programs for classroom teaching-learning*
Theme 4	***TEACHER PROFESSIONAL DEVELOPMENT (TPD)***	
1	*TPD-GEN*	*General details/scenario regarding professional development of teachers in the country*
2	*TPD-CON*	*PD on subject related content*
3	*TPD-PED*	*PD on subject related pedagogy*
4	*TPD-CLMG*	*PD on classroom management*
5	*TPD-CEN*	*PD on 21st Century Skills*
6	*TPD-CHI*	*PD on child rights, child protection, child development, child psychology*
7	*TPD-AR*	*PD on Action Research*
8	*TPD-MENT*	*PD on Mentoring*
9	*TPD-ICT*	*Respondent is talking about the professional development of teachers on ICT*
10	*TPD-OTHER*	*PD on another topic/theme*
11	*TPD-LG*	*Local Government-training of teachers*
12	*TPD-BUD*	*Budget for training of teachers*
Theme 5	***ACTION RESEARCH (AR)***	
1	*AR-DEF*	*Definition of Action Research*
2	*AR-SOL*	*Using Action Research to solve local contextual problems*
3	*AR-EG*	*Sharing examples of Action Research conducted*

4	*AR-Chall*	*Challenges in conducting Action Research*
Theme 6	***MENTORING (MENT)***	
1	*MENT-DEF*	*Definition of mentoring*
2	*MENT-MENTOR*	*Sharing experience/example of being a mentor*
3	*MENT-MENTEE*	*Sharing experience/example of being a mentee*
4	*MENT-INFOR*	*Mentoring is informal*
5	*MENT-FOR*	*Mentoring is a formal structure*
Theme 7	***PROFESSIONAL LEARNING COMMUNITY (PLC)***	
1	*PLC-NO*	*Not part of any Professional Learning Community*
2	*PLC-ONL*	*Online Professional Learning Community*
3	*PLC-PHY*	*In Person Professional Learning Community*
4	*PLC-FORM*	*PLC-It is a formal group*
5	*PLC-INFORM*	*PLC-It is an informal group*
6	*PLC-TPD*	*Discussion is around TPD*
7	*PLC-ADMIN*	*Discussion is around admin issues*
8	*PLC-RES*	*Discussion is around research*
9	*PLC-OTHER*	*Discussion is around other issues*
10	*PLC-FREQ*	*Frequency of engagement in a Professional Learning Community*
11	*PLC-BEN*	*Benefit/usefulness of being part of a Professional Learning Community*
12	*PLC-Chall*	*Challenges in being part of a Professional Learning Community*
Theme 8	***ICT***	
1	*ICT-PD*	*Using ICT one's own professional development*
2	*ICT-PDTE*	*Using ICT for training/professional development of teachers*
3	*ICT-TL*	*Using technology for classroom teaching-learning*
4	*ICT-BEN*	*Benefit of using ICT for teaching learning/training of teachers*
5	*ICT-Chall*	*Challenges in using ICT for teaching learning/training of teachers*
Theme 9	***COLLABORATION***	
1	*COLL-PD*	*Collaboration for one's own professional development, Sharing of experiences and examples.*
2	*COLL-TT*	*Training teachers on the concept of collaboration*

3	*COLL-OTH*	*Collaboration for any other activity*
Theme 10	***REFLECTION***	
1	*REF-PD*	*Reflection for one's own professional development, Sharing of experiences and examples.*
2	*REF-TT*	*Training teachers on the concept of reflection*
3	*REF-STU*	*Reflection by students, Sharing of experiences and examples.*
4	*REF-OTH*	*Reflection for any other activity*

Endline Interview

THEMES	***CODES***	***CODE DESCRIPTION***
Theme 1	***MATPD***	
1	*MATPD-ROLE*	*Role of the fellows within the MATPD project*
Theme 2	***PROFESSIONAL DEVELOPMENT***	
1	*TPD-NEW*	*Fellows' mention of concepts that were new to them*
2	*TPD-DIFF*	*Fellows' experiences of MATPD including aspects that were different & useful to them*
3	*TPD-CHALL*	*Fellows' experiences of MATPD that were challenging for them*
4	*TPD-TR-LEARN*	*Fellows' opinion on how teachers learn*
5	*PDTE-SKILLS*	*Skills & competencies required to be an effective teacher educator*
6	*TPD-ID*	*Fellows' identification as a teacher educator*
7	*TPD-CON*	*Fellows' understanding of the connections between the different themes /ideas in the MATPD project*
8	*TPD-BL*	*Fellows' thoughts & opinions about using blended approaches for effective TPD in their country context*
Theme 3	***ACTION RESEARCH***	
1	*AR-EXP*	*Fellows sharing their overall experiences of conducting Action Research*
2	*AR-SUB*	*Fellows sharing about the subject knowledge that they have gained as a result of working on that particular theme*
3	*AR-PDTE*	*Action Research to strengthen the professional development of teacher educators*

4	*AR-TR*	*Fellows' describing details of their work with the teachers for their Action Research.*
5	*AR-WELL*	*What went well in the fellows' Action Research*
6	*AR-GAP*	*What were the gaps in fellows' Action Research*
7	*AR-USE*	*Fellows' ideas & thoughts about using Action Research in the future*
8	*AR-PRAC-CHALL*	*Challenges that will prevent fellows and other teachers/teacher educators from practicing AR*
9	*AR-PRAC-SUPP*	*Support mechanisms required to make Action Research part of fellows/other teachers' & teacher educators' regular practice*
Theme 4	***MENTORING***	
1	*MENT-UN*	*Fellows' understanding of mentoring*
2	*MENT-DIFF*	*Fellows' understanding of how mentoring is different from monitoring*
3	*MENT-PDTE*	*Mentoring to enhance/strengthen the professional development of teacher educators*
4	*MENT-TR*	*Using learnings from the fellowship in mentoring teachers for their professional development*
5	*MENT-SKILLS*	*Skills and qualities acquired by the fellow during the course of the fellowship*
6	*MENT-BL*	*Fellows' thoughts and opinions on how different/useful was the blended mode of mentoring for their AR*
7	*MENT-BARR*	*Fellows' talking about various barriers during their mentoring process. eg. language, context*
8	*MENT-GEN*	*Impact of gender & seniority in the process of mentoring, either as a mentee or a mentor, any other barriers like language etc.*
9	*MENT-AM*	*Fellows experiences with the AM (this will have to be double coded with either MENT-MENTEE or MENT-MENTOR*
10	*MENT-FM*	*Fellows experiences with the FM (this will have to be double coded) with either MENT-MENTEE or MENT-MENTOR*
11	*MENT-MENTOR*	*Fellows' experiences of mentoring as a mentor during the course of the fellowship*
12	*MENT-SCALE*	*Fellows' ideas & thoughts about the mentoring model/process that will work in your country context*
Theme 5	***SOCIAL LEARNING***	
1	*SL-MATPD-INTER*	*Fellows' cross country interaction with each other for learning*

2	*SL-MATPD-FORMAL*	*Fellows' engagement in formal platforms to enhance their PD (MATPD telegram groups, discussion forum, enrichment sessions etc.) including challenges faced*
3	*SL-AR-SHARE*	*Fellows sharing about their AR experiences and learnings with others*
4	*SL-AR-TR*	*Fellows sharing details obout the platforms used to communicate with their participating AR teachers*
5	*SL-MATPD-INFORMAL*	*Fellows' engagement with other fellows in informal groups (whatsapp, telegram, viber etc.) for the MATPD project*
6	*SL-PART*	*Fellows sharing ways to increase participation and engagement of people in chat groups for projects*
7	*SL-COLL-PD*	*Fellows' collaboration with any teacher/teacher educator for one's own professional development*
Theme 6	***REFLECTION***	
1	*REF-ROLE*	*Role of reflection in improving practice*
2	*REF-EXP*	*Fellows' experiences of reflection during the course of the fellowship*
Theme 7	***ICT***	
1	*ICT-PDTE*	*Meaningful use of ICT to help strengthen the professional development of teacher educators*
2	*ICT-PD*	*Digital tools, apps etc. used by fellows for their own professional development during the fellowship*
3	*ICT-TLP*	*Digital tools, apps etc. used by fellows for classroom teaching learning during the course of the fellowship including challenges faced*
4	*ICT-TRAIN*	*Digital tools, apps etc. used by fellows for training teachers during the course of the fellowship including challenges faced*
5	*ICT-TPACK*	*Knowledge of TPACK in teaching learning in classroom setting*
6	*ICT-USE*	*Fellows using and exploring ICT in their practice in the future*
Theme 8	***GESI***	
1	*GESI-DEF*	*Fellows' understanding of the term Inclusion*
2	*GESI-TLP*	*Diversity observed in own teaching experiences within classroom setting*
3	*GESI-CHALL*	*Challenges observed/faced in addressing matters of inclusion within the classroom setting*
4	*GESI-AR-TR*	*Inclusion & diversity in fellows' **teacher selection** for their Action Research*

5	*GESI-AR-CO*	*Inclusion/exclusion & diversity observed while the teacher is taking the class* ***(classroom observation during AR)***
6	*GESI-AR-PP*	*Inclusive* ***pedagogical practices*** *adopted by fellows in their Action Research*

Appendix E

Teacher Professional Development Survey Responses

Table E1: Types of TPD Activities - Baseline Study

TPD ACTIVITIES	Not Participated	Participated	Resource Person	Designed the Training Program	Coordinator/ Organizer
Courses/workshops (e.g. on subject matter or methods and/or other education-related topics)	3	12	4	4	5
Education conferences or seminars	3	14	5	2	7
Observation visits to other schools	7	9	1	1	4
Observation visits to other teacher education institutes	13	4	1	1	1
Physical meet up in a network of teachers	5	10	3	1	2
Being part of an online network of teachers	3	9	4	2	3
Individual or collaborative research	6	10	2	2	6
Individual or collaborative action research	7	8	3	1	4
Mentoring and/or peer observation and coaching	4	2	1	0	2
Reading professional literature (e.g. journals, evidence-based papers, thesis papers)	3	6	2	1	2
Engaging in informal dialogue with peers on how to improve teaching	1	14	3	1	3
Participation in Exchange programs (visit to other countries)	14	3	1	1	1

Appendix F

Action Research Survey Responses

Table F1: Beliefs on Various Aspects of Action Research - Baseline Study

BELIEFS ABOUT VARIOUS ASPECTS OF ACTION RESEARCH	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
An individual student can be studied for Action Research	1	0	0	4	10
A group of students can be studied for Action Research	0	0	0	3	12
A classroom can be studied for Action Research	0	0	0	3	12
A school can be studied for Action Research	0	0	1	2	12
A community can be studied for Action Research	0	0	2	4	9
A Teacher Education Institute can be studied for Action Research	0	0	1	4	10
Government functionaries (Education Department) can be studied for Action Research	0	1	2	3	9
Action research helps develop new knowledge related to classrooms	0	0	0	3	12
Action research helps to better understand how students learn	0	0	0	3	12
Action research helps improve students' learning outcomes	0	0	0	4	11
Action research helps to reflect and bring about a change in one's own practice	0	0	0	3	12
Action research helps to take ownership in problem solving, constructing knowledge and one's own professional growth	0	0	0	2	13
Action research enables schools to become effective learning communities	0	0	0	2	13
Action research can only be done by individual teachers in their classroom	11	3	1	0	0
Action research can only be done at school level and not at large scale	9	2	2	1	1

Action research helps to base decisions about teaching and learning practices in data driven, classroom based research findings	0	1	1	2	11
The Action research process is iterative	1	0	0	5	9
Action research can be used to explore solutions for effective professional development of teachers	0	0	0	2	13
Action research helps improve teacher educators/teachers' chances of promotion	2	0	4	3	6

Table F2: Beliefs on Various Aspects of Action Research - Endline Study

BELIEFS ABOUT VARIOUS ASPECTS OF ACTION RESEARCH	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
An individual student can be studied for Action Research	1	0	0	5	7
A group of students can be studied for Action Research	0	0	1	1	11
A classroom can be studied for Action Research	0	0	0	2	11
A school can be studied for Action Research	0	0	1	3	9
A community can be studied for Action Research	0	0	1	3	9
A Teacher Education Institute can be studied for Action Research	0	0	2	3	8
Government functionaries (Education Department) can be studied for Action Research	0	0	3	3	7
Action research helps develop new knowledge related to classrooms	0	0	1	1	11
Action research helps to better understand how students learn	0	1		2	10
Action research helps improve students' learning outcomes	0		1	2	10
Action research helps to reflect and bring about a change in one's own	0	0	0	3	10

practice					
Action research helps to take ownership in problem solving, constructing knowledge and one's own professional growth	0	0	0	3	10
Action research enables schools to become effective learning communities	0	0	1	2	10
Action research can only be done by individual teachers in their classroom	7	2	1	2	1
Action research can only be done at school level and not at large scale	6	2	0	4	1
Action research helps to base decisions about teaching and learning practices in data driven, classroom based research findings	0	1	0	4	8
The Action research process is iterative	0	0	2	4	7
Action research can be used to explore solutions for effective professional development of teachers	0	0	1	4	8
Action research helps improve teacher educators/teachers' chances of promotion	0	0	2	4	7

Appendix G

Mentoring Survey Responses

Table G1: Knowledge and Skills for Mentoring - Baseline Study

SKILLS & QUALITIES TO BE AN EFFECTIVE MENTOR	New to me	Low ability	Moderate ability	Highly developed
Share knowledge, skills, experiences and learnings with the mentee	2	3	9	4
Provide constructive and non-judgemental feedback to the mentee	2	3	5	8
Listen actively to the mentee	2	4	5	7
Good at eliciting responses and getting the mentee to think and reflect	2	4	8	4
Encourage and motivate the mentee	2	2	7	7
Show interest in development of the mentee	2	3	9	7
Willing to put aside one's own beliefs and/or prejudices	2	3	9	4
Have expertise in the area of mentoring	3	5	7	3
Good at setting realistic goals for the mentee	3	3	7	5
Good at observing & reflecting on teaching practices	1	2	9	6
Good at showing/demonstrating solutions to the mentee	2	5	7	4
Introduce timelines and stages for a classroom based exploratory action research project	2	5	9	2
Help address queries/worries of the mentee	2	4	9	3

Table G2: Knowledge and Skills for Mentoring - Endline Study

SKILLS & QUALITIES TO BE AN EFFECTIVE MENTOR	New to me	Low ability	Moderate ability	Highly developed
Share knowledge, skills, experiences and learnings with the mentee	0	0	4	9
Provide constructive and non-judgemental feedback to the mentee	0	0	5	8
Listen actively to the mentee	0	0	4	9
Good at eliciting responses and getting the mentee to think and reflect	0	0	6	7

Encourage and motivate the mentee	0	1	4	8
Show interest in development of the mentee	0	0	5	8
Willing to put aside one's own beliefs and/or prejudices	0	1	7	5
Have expertise in the area of mentoring	0	3	8	2
Good at setting realistic goals for the mentee	0	0	9	4
Good at observing & reflecting on teaching practices	0	1	4	8
Good at showing/demonstrating solutions to the mentee	0	0	8	5
Introduce timelines and stages for a classroom based exploratory action research project	0	1	8	4
Help address queries/worries of the mentee	0	1	6	6

Appendix H

Reflection Survey Responses

Table H1: Frequency of Engagement - Baseline Study

REFLECTIVE ACTIVITIES	Daily	A few times a week	A few times a month	Once a month	Never
After class, I reflect on my lessons	7	4	6	0	1
I analyze video recordings of my lessons to improve my teaching practice as a teacher educator	1	2	2	2	11
I discuss with my students/student teachers what they experience in my lessons to improve my teaching practice as a teacher educator	3	1	7	5	2
I visit lessons of peers/colleagues to learn from them	1	1	2	5	9
I ask my peers/colleagues to attend some of my lessons to get feedback on my teaching	0	2	0	5	11
I discuss events in my teaching with others to learn from them	2	3	7	4	2
I participate in peer review meetings at my school/teacher education institute to learn from peers/colleagues	2	0	5	5	6
I analyze a problem in my practice thoroughly before choosing a solution	4	6	4	4	0
I study artifacts (student homework, models, lesson plans, blackboard work) from students/student teachers to understand how my approach has worked	6	2	3	6	1
I ask students/student teachers to fill out surveys for feedback on my lessons	2	1	3	9	3
I deal with problems in my teaching by looking at what the literature says about them	4	2	0	8	4
I use student/student teacher performance data to, where needed, adjust my teaching	3	1	2	7	5
Once a problem or question arises in my teaching practice, I carry out a small research project into possible causes and solutions	1	1	1	7	8

Table H2: Frequency of Engagement - Endline Study

REFLECTIVE ACTIVITIES	Daily	A few times a week	A few times a month	Once a month	Never
After class, I reflect on my lessons	8	4	1	0	0
I analyze video recordings of my lessons to improve my teaching practice as a teacher educator	1	1	2	1	8
I discuss with my students/student teachers what they experience in my lessons to improve my teaching practice as a teacher educator	4	5	4	0	0
I visit lessons of peers/colleagues to learn from them	1	1	5	2	4
I ask my peers/colleagues to attend some of my lessons to get feedback on my teaching	2	0	2	4	5
I discuss events in my teaching with others to learn from them	2	5	5	1	0
I participate in peer review meetings at my school/teacher education institute to learn from peers/colleagues	2	4	5	1	1
I analyze a problem in my practice thoroughly before choosing a solution	6	5	1	1	0
I study artifacts (student homework, models, lesson plans, blackboard work) from students/student teachers to understand how my approach has worked	5	4	4	0	0
I ask students/student teachers to fill out surveys for feedback on my lessons	5	0	5	3	0
I deal with problems in my teaching by looking at what the literature says about them	3	5	1	2	2
I use student/student teacher performance data to, where needed, adjust my teaching	3	2	5	2	1
Once a problem or question arises in my teaching practice, I carry out a small research project into possible causes and solutions	1	1	3	4	4

Appendix I

ICT Survey Responses

Table I1: Access and Use of Technology - Baseline Study

ACCESS & USE OF TECHNOLOGY	Yes	No
Do you have a mobile/smart phone?	15	0
Does your mobile /smart phone have internet access/data plan?	15	0
Do you have any applications for group chats: whatsapp, telegram, facebook messenger etc.?	15	0
Outside of school, do you have access to a computer, laptop or a tablet? (personal or owned by family members)	15	0

Table I2: Use of Computers - Baseline Study

USE OF COMPUTERS	<1	1-2	2-5	More than 5	Does not exist
At school-computer lab	2	0	2	10	1
At school-in classroom for teaching	1	0	2	11	1
At school-office/admin use	1	0	2	12	0
At home-for personal and official purpose	1	0	2	12	0
At a computer center /cafe	4	0	0	3	8

Table I3:Use of Various Technology Devices - Baseline Study

USE OF VARIOUS TECHNOLOGY DEVICES (SCHOOL/TEI)	Do not have	Not in a working condition	Never used	two to three times a month	Use it at least once a week	Use it almost every day	NA
Mobile phone	0	0	0	1	1	10	3
Laptop/Computer	0	0	0	0	1	11	3
Smartboard	8	0	3	1	0	0	3
Tablet	0	1	4	3	2	2	3
LCD Projector	3	0	3	2	0	4	3
TV	0	0	1	3	3	4	4
Digital camera	3	0	5	2	1	1	3

Overhead Projector	4	0	3	2	0	3	3
CD/DVD Player	5	0	5	0	2	0	3
Radio	5	0	4	2	0	1	3
Satellite classrooms	5	1	4	2	0	0	3

Table I4:Use of ICT for Teaching and Learning - Baseline Study

USE OF ICT FOR TEACHING LEARNING	Do not have	Not in a working condition	Never used	two to three times a month	Use it at least once a week	Use it almost every day
Browsed/ searched the internet for personal use	0	0	0	0	0	15
Browsed/ searched the internet to collect teaching materials to prepare lessons	1	0	0	1	4	9
Use powerpoint /slides for presenting in conference/district meeting/other	1	0	0	4	2	8
Created digital learning materials for students	2	0	1	5	1	6
Searched for courses/ activities for professional development	2	0	2	4	3	4
Interacted with online teachers' communities (including whatsapp groups)	2	0	2	4	2	5
Documented your class-work using video/audio	3	1	3	1	4	3
Used Smart-boards	10	0	4	0	0	1
Taken clippings on mobile phone for showing it to students in classrooms	4	0	4	3	3	1

Table I5: Activities Using Laptop/Computers

ACTIVITIES DONE USING LAPTOP COMPUTER (LAST 1 YEAR)	Have done it without any difficulty on my own,	Have done it on my own with some difficulty,	Have done it with difficulty, with lot of help,	Have never done it on my own or with help from others
a computer /Laptop	15	0	0	0

Handle mouse	15	0	0	0
Use word/note pad files	15	0	0	0
Use powerpoint	15	0	0	0
Type in English in computer/Laptop	15	0	0	0
Save files	15	0	0	0
Use spreadsheet	14	1	0	0
Use paint brush	13	0	0	2
Use Internet Browser	15	0	0	0
Send emails	15	0	0	0
Use hyperlinks	15	0	0	0
Record audio/video on phone/camera	14	0	1	0
Download and upload files on whatsapp	13	1	0	1
Click pictures with digital camera	13	0	0	2
Use simulations to demonstrate experiments virtually	5	0	1	9
Program a task	7	1	2	5
Use online maps	9	4	0	2
Download & use apps on mobile phone	14	0	0	1
Book tickets	10	2	0	3
Use videoconferencing	12	3	0	0
Use Geogebra to create lesson plans	2	1	0	12
Create picture stories using text and image editing tools	5	2	3	5

Table I6: Ability to use ICT

ABILITY TO USE ICT FOR VARIOUS ACTIVITIES	New to me	Low ability	Moderate ability	High ability
I can find animations related to my course and deploy them	0	1	5	9
I can find videos from Internet to support course content and have my students watch them	0	0	1	14
I can create online personal BLOGs (i.e., blogger and wordpress)	3	3	4	5
I can inform my students about computer ethics.	0	2	5	8
I can effectively use search engines.	0	1	2	12
I can use social networking services (i.e., Facebook, Twitter) for educational	0	0	4	11

purposes.				
I can share instructional materials that I find online (via e-mail, Dropbox, Google Drive, etc.) with my students	0	0	1	14

Table I7: Descriptive Statistics on the Belief about the use of Technology

Item Statistics						
	Baseline			Endline		
Beliefs about the use of Technology	**Mean**	**Std. Deviation**	**N**	**Mean**	**Std. Deviation**	**N**
Integrating technology in teaching will improve classroom instruction and practice	4.67	1.047	15	4.08	1.498	13
Instruction is most effective when teachers collaborate with other teachers or experts	4.53	1.060	15	3.77	1.423	13
Availability of ICT resources increases my productivity and professional effectiveness	4.67	1.047	15	4.15	1.519	13
Integrating technology in teaching can improve students' learning outcomes	4.60	1.056	15	4.00	1.472	13
Computers make students lazy	3.60	.910	15	4.15	1.144	13
Computers help students grasp difficult curricular concepts	4.27	1.163	15	4.23	1.166	13
Students create better projects with computers than with other traditional material.	4.13	1.246	15	3.69	1.182	13
Integrating technology in teaching will increase collaboration among students	4.27	1.163	15	3.62	1.261	13
Use of Technology is mostly for developing technical skills and it is not useful in applying or drawing out real life examples of concepts in textbook	3.93	1.100	15	4.31	.947	13

Table I8: Challenges to Using ICT

CHALLENGES TO EFFECTIVELY USING ICT	Extremely challenging	To some extent challenging	Not sure whether it is really a challenge	Not a challenge	Not a challenge at all, rather it is an opportunity to convert the scenario
Not enough computers/laptops in the computer lab	10	3	0	1	1
Not enough training for the teachers to use computers/laptops	6	7	0	1	1
Not enough opportunity to practice computers/laptops in curriculum	4	8	1	1	1
Unstable/intermittent power supply	8	3	1	3	0
Frequent crashing of computers or outdated computers	6	7	2	0	0
Internet is too slow	13	2	0	0	0
High cost of internet	12	2	0	1	0
All students do not have access to computers/laptops	11	3	1	0	0
Students are unable to connect due to poor/no connectivity	11	3	1	0	0
Too many students in the class (difficult to give individual attention to students)	6	7	1	1	0
Don’t know how to use computers/laptop for the subjects I teach	1	1	2	5	6
Leadership is not supportive	2	5	1	5	2
Students are at different levels	3	9	1	0	2
Computer teacher is not available	3	4	4	1	3
Use of technology will take time away from completion of syllabus	2	2	2	6	3
6Use of technology will make it difficult to manage students in the class as they have difficulties with operation of a computer/laptop	2	3	3	3	4

Appendix J

Collaboration Survey Responses

Table J1: Frequency of Engagement - Baseline Study

COLLABORATIVE ACTIVITIES	Daily	A few times a week	A few times a month	Once a month	Never
I talk about teaching problems with colleagues	8	4	3	3	0
I support colleagues in their teaching problems	6	4	5	3	0
I share new teaching ideas with colleagues	5	6	2	5	0
I share learning experiences with colleagues	7	5	2	4	0
I talk about the way I deal with events in my lessons with colleagues	6	4	3	4	1
I talk to colleagues about what I think is important in education	8	4	3	3	0
I discuss scientific educational theories with colleagues	3	5	4	3	3
I discuss improvement and innovation of education at my school/teacher training institute with colleagues	6	3	3	4	2
I use colleagues' teaching materials in my lesson	1	6	4	3	4
I write a new curriculum with colleague	0	1	2	4	11
I construct (digital) teaching material with colleagues	3	2	1	6	6
I construct testing and examination materials with colleagues	3	1	0	8	6
I study student/student teacher performance data with colleagues	3	1	1	9	4
I prepare lesson plans with colleagues	4	1	1	4	8
I experiment with new teaching methods with colleagues	2	3	1	6	6
I give lessons with peers/colleagues (team teaching)	4	2	1	0	7

Table J2: Frequency of Engagement - Endline Study

COLLABORATIVE ACTIVITIES	Daily	A Few times a week	A few times a month	Once a month	Never
I talk about teaching problems with colleagues	5	4	3	1	0
I support colleagues in their teaching problems	5	5	3	0	0
I share new teaching ideas with colleagues	4	5	4	0	0
I share learning experiences with colleagues	5	6	2	0	0
I discuss my classroom teaching experiences with my colleagues	4	5	4	0	0
I talk to colleagues about what I think is important in education	4	5	2	2	0
I discuss scientific educational theories with colleagues	3	2	4	2	2
I discuss improvement and innovation of education at my school/teacher training institute with colleagues	3	5	4	0	1
I use colleagues' teaching materials in my lesson	5	2	4	0	2
I write a new curriculum with colleague	2	0	1	4	6
I construct (digital) teaching material with colleagues	2	5	0	4	2
I construct testing and examination materials with colleagues	2	3	2	3	3
I study student/student teacher performance data with colleagues	1	3	3	3	3
I prepare lesson plans with colleagues	1	4	4	2	2
I experiment with new teaching methods with colleagues	2	3	2	3	3
I give lessons with peers/colleagues (team teaching)	2	3	1	3	4

Appendix K

Gender Equality and Social Inclusion Survey Responses

Table K1: - Baseline Study

GESI	Most of the times	Sometimes	Rarely	Never
Schools/Teacher Education Institutes are inclusive as they allow students with disability to study with other students	6	8	1	0
There are separate schools for students with disability	0	5	4	6
There are special educators for students with disability	2	10	3	0
There are adequate infrastructural resources for students with disability in the schools	1	3	10	1
The teachers are trained in methods and pedagogy that can support learning of students with disability	1	8	6	0
Teachers are keen to help the students with disability	2	10	3	0
Parents are interested in education for children with disability	6	9	0	0
Students with disability are discriminated against in the society	1	9	4	1
Girls are given equitable treatment in schools	14	0	1	0
Economically weak students are given equitable treatment in schools	10	5	0	0
General education teachers are adequately prepared in teacher education to address learning issues of students with disabilities	3	4	8	0
Students with disabilities get adequate time from the teachers in the integrated classrooms	0	5	10	0
Students with disabilities are not preferred in integrated classrooms due to their behaviour problems.	3	11	1	0
Students with disabilities and economically weaker sections get extra time and assistance from the teachers.	2	6	6	1
All the students irrespective of their gender, class and ability get the opportunity to express their ideas/opinions in the classroom.	10	3	1	1