



Indian Institute of Technology Bombay

IDP in Educational Technology

PhD Thesis Defense on

**A Model to improve the Effectiveness of Secondary
Trainers in cascaded Teacher Professional
Development Programmes**

Presented by:

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August 8, 2023

Outline

1. Motivation
2. Research Scope
3. Research Methodology
4. DBIR Cycle 1
5. DBIR Cycle 2
6. A2IT2 Model
7. Confirmatory Study
8. Claims and Implications
9. Generalizations, Limitations
10. Contributions, Recommendations and Future Work

Motivation

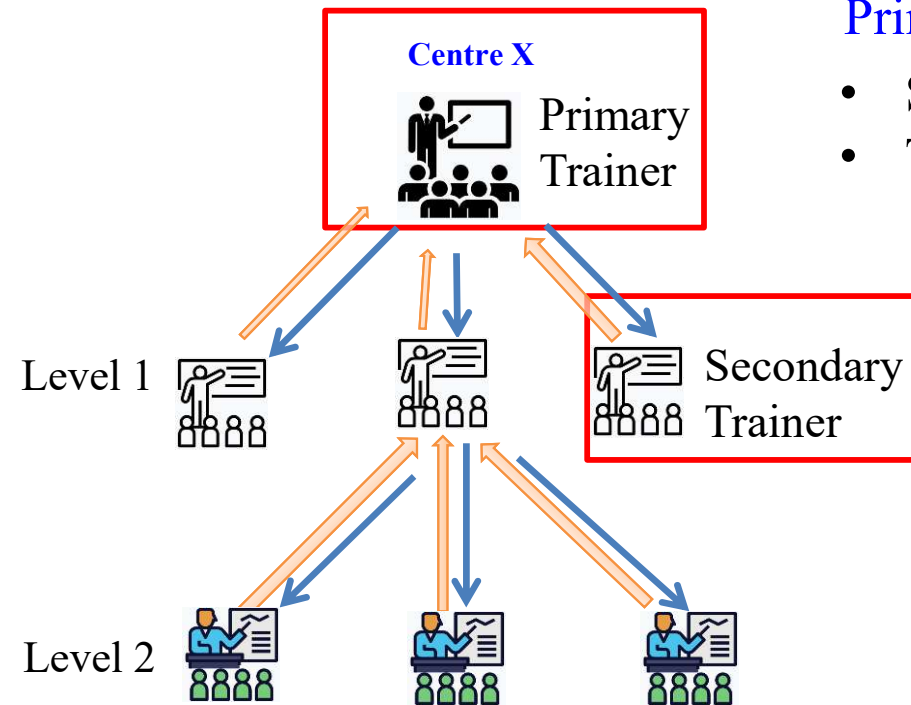
Primary Trainers

- Short time (3-5 days)
- Too much content

Expectations:

Secondary Trainers are full trainers who can:

- Plan a full training,
- Conduct the same training and
- Evaluate the training



Motivation

My participation:

National ICT Programme for Secondary School Teachers (2011-2016)

What general DIFFICULTIES did you face when starting to prepare to train others?

“...Some concepts were not clearly understood due to shortage of time, that caused difficulties when passing through the handout...”

T1

“Understanding some technical words”

T2

“... No enough time to be familiar with the course contents, and no follow up was made...”

T3

Motivation

Selection of teachers should consider those interested in learning ICT and **those who are ready to train others.** Either, include female teachers to encourage participation of girls in ICT subjects

DODOMA
Simu Na: +255 26 2321607
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Barua pepe: ps@tamisemi.go.tz



Mtumba,
Mtaa wa TAMISEMI,
S.L.P. 1923,
41185 DODOMA.

Unapojibu tafadhali taja:-
Kumb Na. FC.156/358/01/200
Makatibu Tawala wa Mikoa,
TANZANIA BARA.

29 Septemba, 2022

Yah: **MAFUNZO YA TEHAMA KWA WALIMU 648 KUTOKA SHULE 216 KUANZIA TAREHE 17 – 21 OKTOBA, 2022, KATIKA VITUO VYA DIT, UDOM NA MUST**

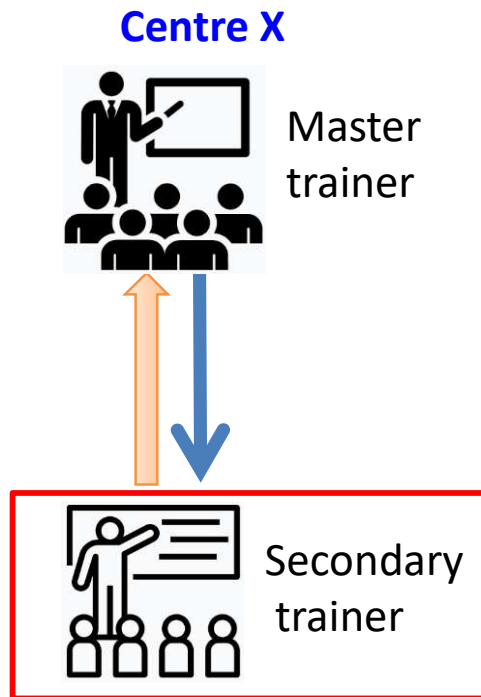
Tafadhali rejea somo tajwa hapo juu.

2. Ofisi ya Rais - Tawala za Mikoa na Serikali za Mitaa kwa kushirikiana na Mfuko wa Mawasiliano kwa wote – **Universal Communication Service Access Fund UCSAF** itafanya mafunzo ya TEHAMA kwa **Walimu 648** kutoka katika Shule za Msingi na Sekondari nchini.



6. Vigezo vya kupewa walimu hao ni pamoja na wale wanaopenda kujifunza masuala ya TEHAMA na wako tayari kuwafundisha wengine au kutatua changamoto mbalimbali za TEHAMA pindi zikitokea. Aidha, ni vema Walimu wa Kike wakapewa nafasi sawa na Walimu wa Kiume ili kuchochea ushiriki wa wanafunzi wengi wa kike katika masomo ya TEHAMA.

From Literature, challenges to cascade implementation



Training Design-related

Longer periods between cascades (Dichaba, 2013)

No emphasis on the instructional practices (Hooker, 2008)

Top Down Design approach (Komba and Mwakabenga, 2019)

One-way transmission, no feedback (McDevitt, 1998)

Secondary Trainer – related

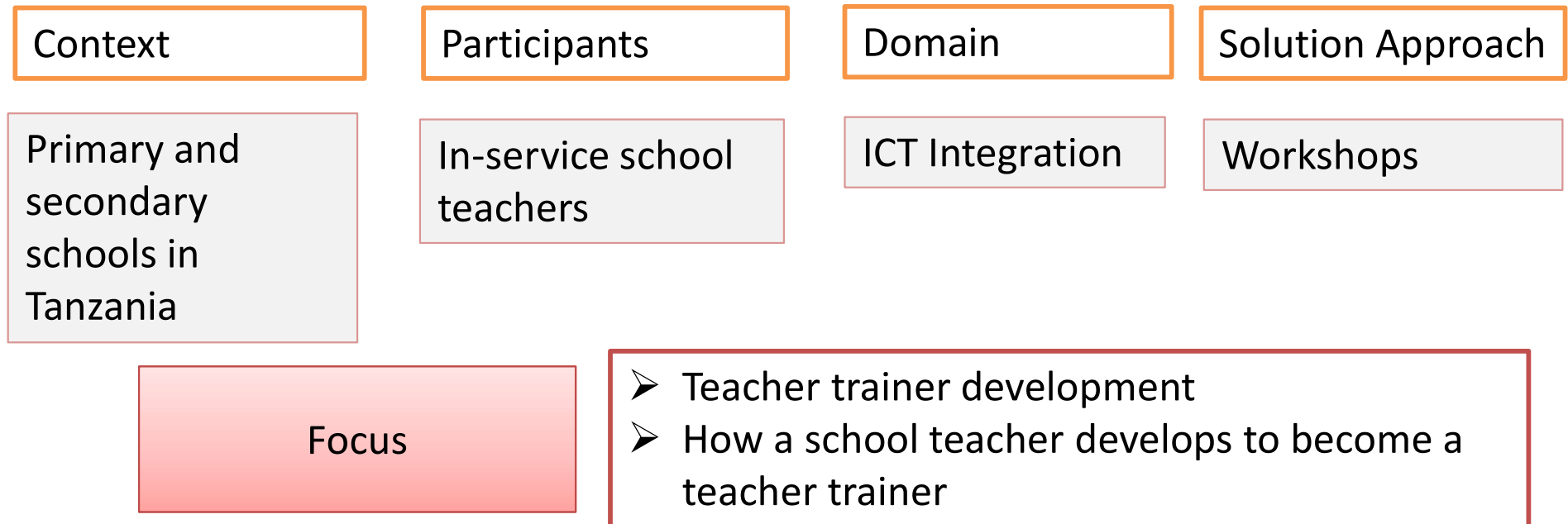
Lack of trainers confidence (Engelbrecht et al, 2007; De Swardt, 2007)

Curriculum misinterpretation (Jansen, 2003; Suzuki, 2011)

Dilution of the teaching content at different levels (Hayes, 2000; Mokhele, 2012)

Broad Research Goal

To develop a model to improve the effectiveness of secondary trainers in cascaded Teacher Professional Development Program



Abbreviations used in this Presentation

1. CW: Content Workshop
2. SW: Skills Workshop
3. L: Learner
4. LA: Learning Assistant
5. CoT: Co-trainer
6. T: Fully developed trainer
7. MT: Master Trainer
8. LO: Learning Objective
9. IS: Instructional Strategy
10. AS: Assessment Strategy

DBIR Methodology

DBIR Principles to Research context

Challenges of implementation of cascaded teacher training programmes

Design: researcher + practitioners + TPD designers

Participants become change agents

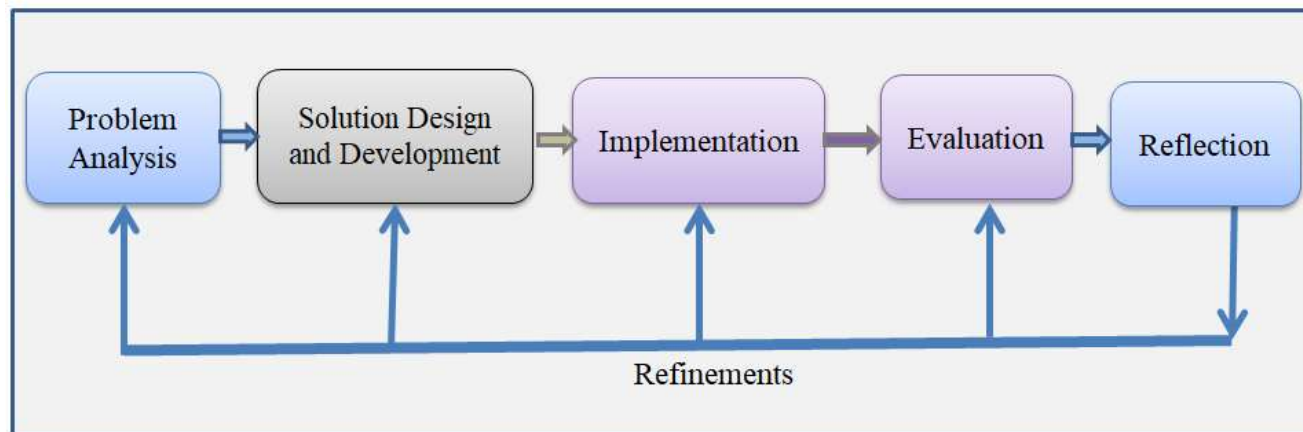
Generate model for improving the effectiveness in cascaded training

Principles of DBIR (Fishman et al., 2013)

- ➔ 1. Persistent problem of practice
- ➔ 2. Solution design is collaborative and iterative
- ➔ 3. Developing capacity for sustaining the change
- ➔ 4. Develops theory and knowledge for training practice

DBIR Cycles

2 Cycles of DBIR, each with 2 Iterations (Reeves, 2006)



DBIR Cycle 1: Iteration 1 and Iteration 2

DBIR Cycle 2: Iteration 3 and Iteration 4

DBIR Cycle 1

Iterations 1 and 2

DBIR Cycle 1 - Iteration 1

Problem Analysis

Problem analysis through literature reviews, practitioners' experiences and Preliminary Study

Preliminary Study @ IIT Bombay: Feb 2018

Interviews with Primary trainers and secondary trainers

2 primary trainers

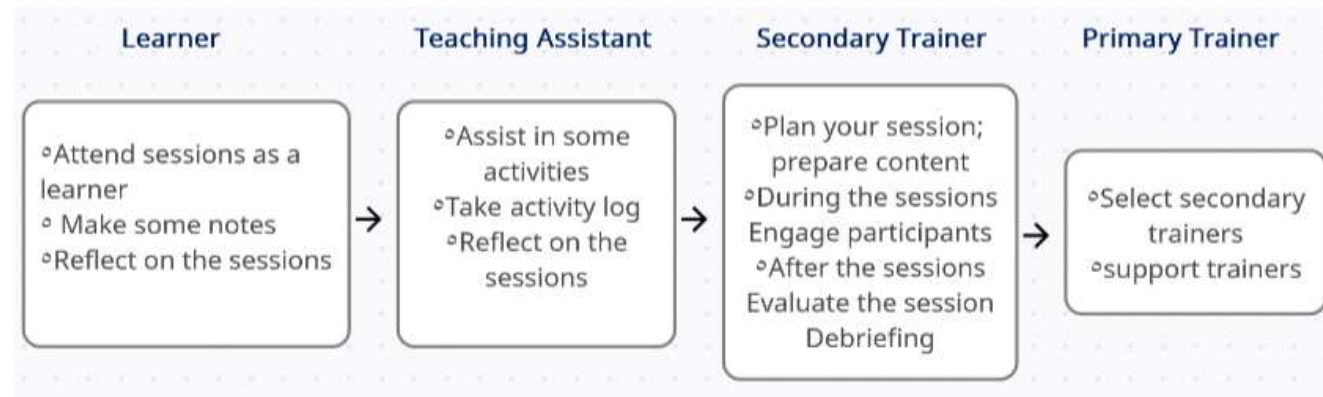
Workshop with 4 secondary trainers

38 novice instructors

RQ1.1: What is expected of teachers selected as secondary trainers in cascaded TPD?

RQ1.2: What kind of support do secondary trainers need from primary trainers?

Results for RQ 1.1



DBIR Cycle 1 - Iteration 1

Problem Analysis

Problem analysis through literature reviews, practitioners' experiences and Preliminary Study

Preliminary Study @ IIT Bombay: Feb 2018

Results for RQ 1.2

Primary Trainer

- Support before and during the sessions
- Continued guidance and mentoring



ST

From the Preliminary Study

- Not every workshop participant can be a ST
- STs evolve through stages
- STs need solid CK of workshop content
- STs need experience of workshops
- STs need skills: content ownership, active learning, facilitation, presentation

DBIR Cycle 1 - Iteration 1

Problem Analysis

Problem analysis through literature reviews, practitioners' experiences and Preliminary Study

Solution Design and Development

Workshop Design

A2I model

Workshop Design

- Conducting Needs Analysis
- Online survey with teachers
- Question: *Which ICT topic(s) would you like to learn to help in ICT integration?*
- 74 teachers responded
- Categorized the topics based on frequency
- 5 topics finalized

Topics:

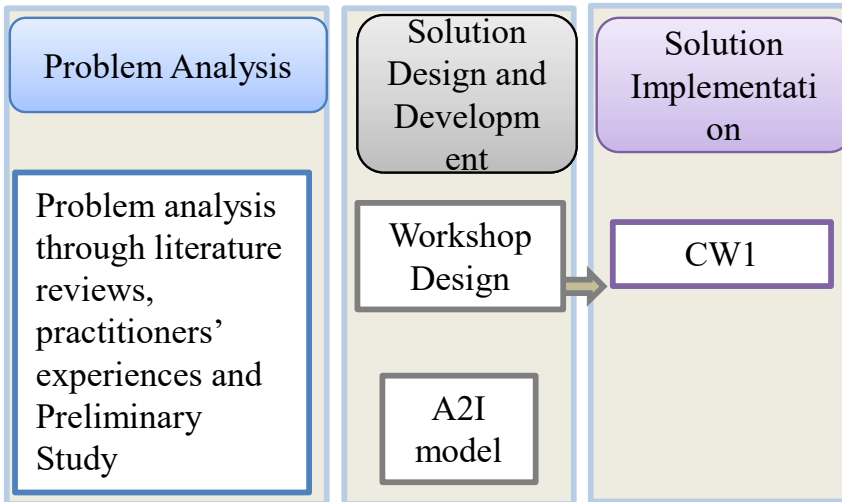
1. Introduction to ICT (Internet and YouTube)
2. Mentimeter in Teaching
3. Padlet in teaching
4. Creating PowerPoint Presentations
5. Introduction to Windows Movie Maker

Designed using A2I Model
(Warriem, Murthy and Iyer, 2014)

A2I model [1] as applied to the Workshop Design

Day	ATTAIN	ALIGN	INTEGRATE
Day 1	Introduction to ICT in T&L (Internet and YouTube)	<ul style="list-style-type: none"> • Creating effective LOs • Aligning assessment methods to LOs 	<ul style="list-style-type: none"> • Introduction to technology integration in lesson plans (LP)
Day 2	<ul style="list-style-type: none"> • Introduce Mentimeter: “What” & “Why” • Let them try the “How” 	Lesson Plan (Individually): <ul style="list-style-type: none"> • Create LOs for a lesson • Set up Mentimeter activities • Set up assessment methods/questions 	<ul style="list-style-type: none"> • Work in groups • Integrate Mentimeter in LP
Day 3	<ul style="list-style-type: none"> • Introduce Padlet: “What” & “Why” • Let them try the “How” 	Lesson plan (Individually): <ul style="list-style-type: none"> • Create LOs for a lesson • Set up Padlet activities • Set up assessment methods/questions 	<ul style="list-style-type: none"> • Work in groups • Integrate Mentimeter in LP
Day 4	<ul style="list-style-type: none"> • Introduce Windows Movie Maker: “What” & “Why” • Let them try the “How” 	<ul style="list-style-type: none"> • Create LOs, activities and assessment for this lesson 	<ul style="list-style-type: none"> • Work in groups • Integrate Windows Movie Maker in LP

DBIR Cycle 1 - Iteration 1

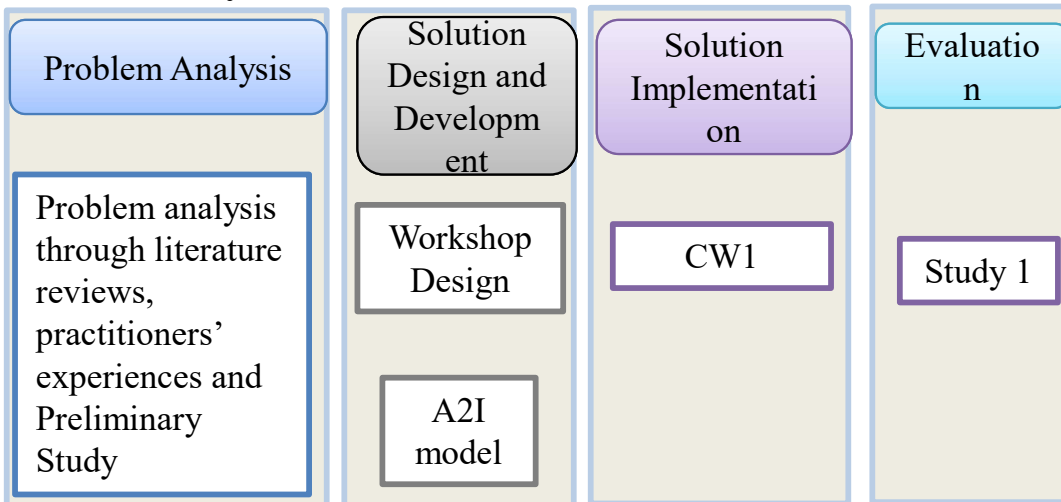


- Workshop in Dec 2018
- Kola Hill Sec School
- 19 Participants (Learners)
- MT
- Worked in groups of 4-5

Submissions at the end

- Each group had to submit a **technology-enhanced lesson plans** showing the integration of **mentimeter, padlet, and online resources**

DBIR Cycle 1 - Iteration 1



Research Questions

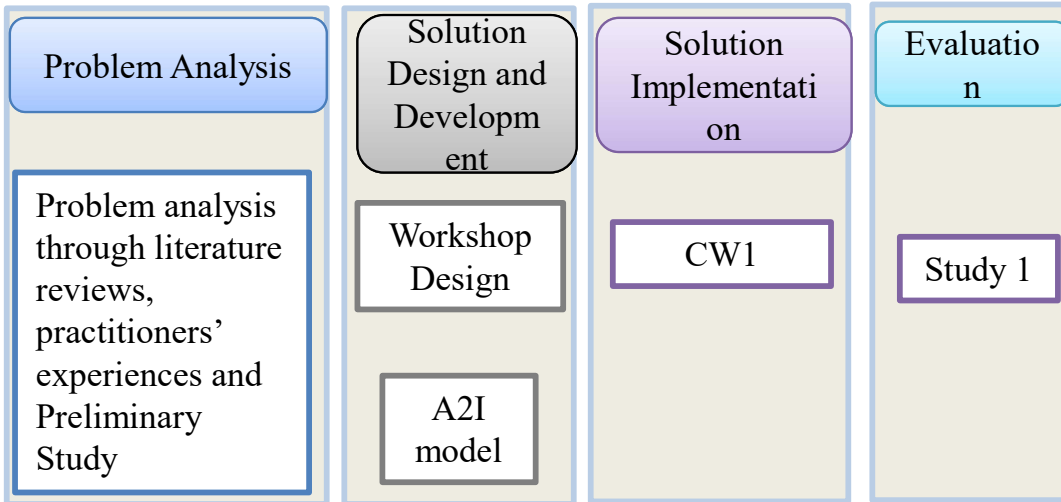
1. What are the teachers' learnings from the workshop?
2. What are the teachers' confidence levels to use technology tools in their teaching and learning?
3. How do trained teachers perceive transfer of knowledge from A2I model based workshop into their contexts?
4. What are the factors that hinder transfer of teacher training in schools?

Results for RQ2: Confidence to use technology

P1: "...instead of using formal methodologies of asking students if they have understood and they just provide a call answer that "Yes, we have understood", I can now use Mentimeter so that each student can give feedback if the lesson was well understood or not".

P2: "Initially, I was able to prepare a PowerPoint presentation, but it was not a very well enriched presentation. Now, I am able to put even animation, including video clips within the presentation".

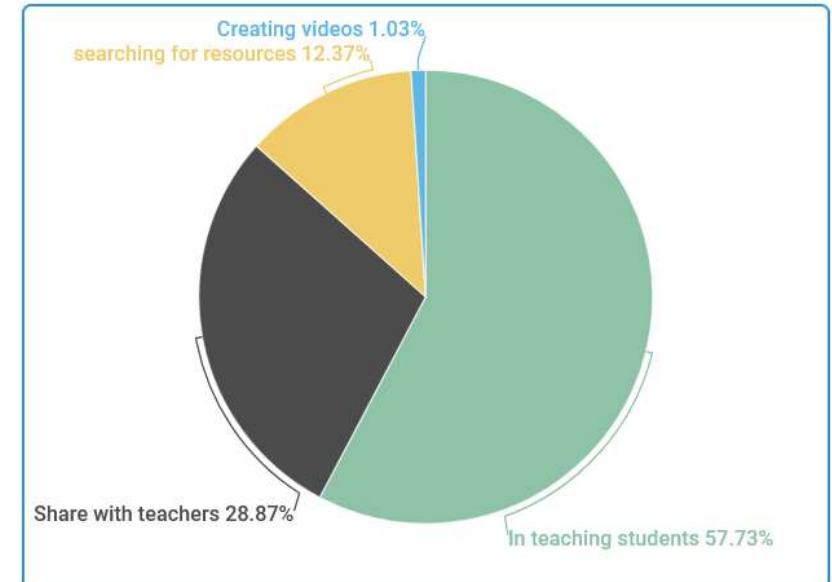
DBIR Cycle 1 - Iteration 1



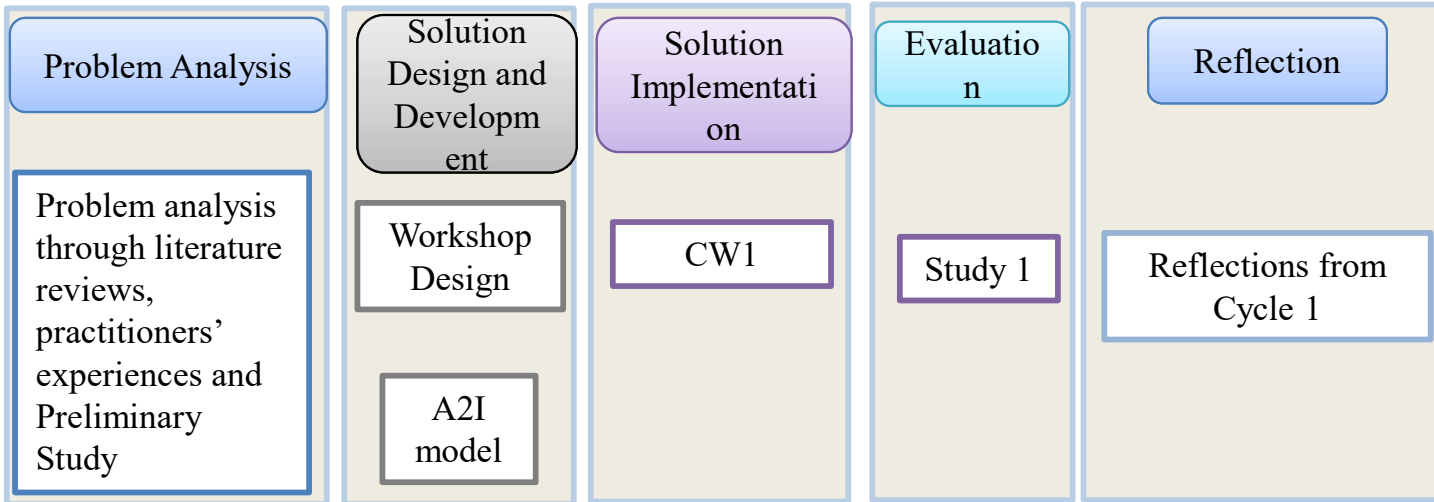
Research Questions

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2. What are the teachers' confidence levels to use technology tools in their teaching and learning?
3. How do trained teachers perceive transfer of knowledge from A2I model based workshop into their contexts?
4. What are the factors that hinder transfer of teacher training in schools?

Results for RQ3



DBIR Cycle 1 - Iteration 1



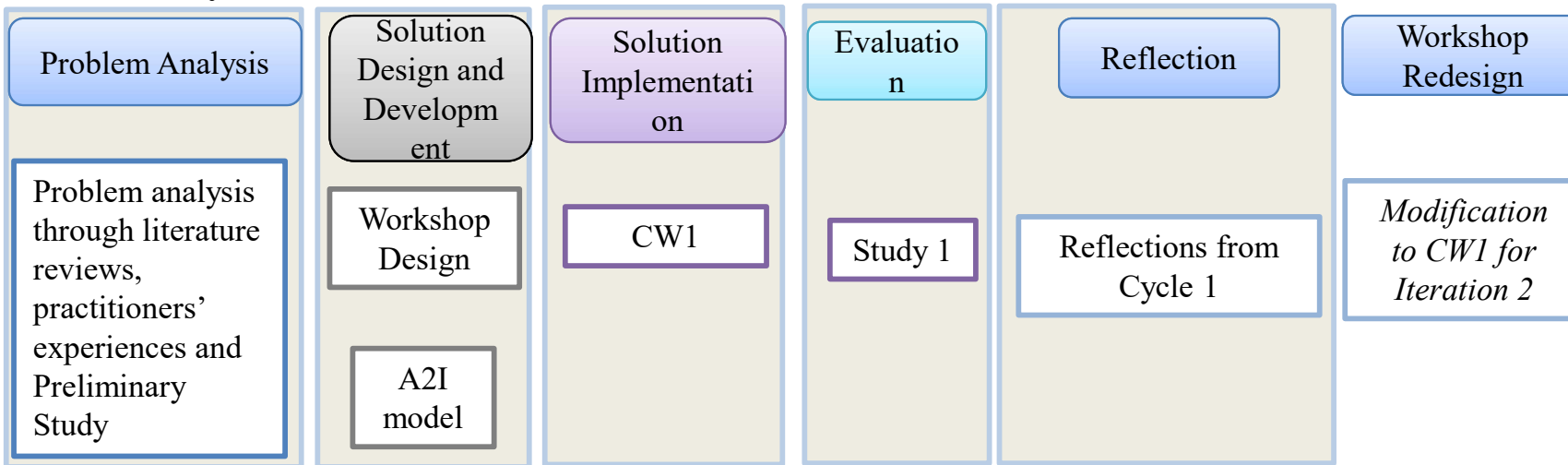
From the submitted lesson plans:

- Some groups were not able to integrate ICT in their lesson plans

From the feedback form:

- More activities for practice, More known examples

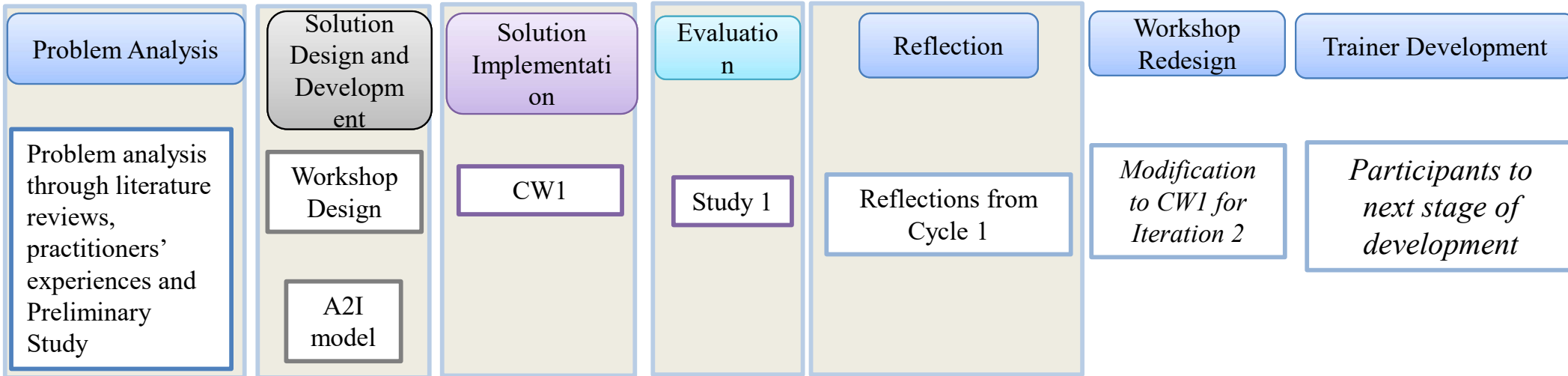
DBIR Cycle 1 - Iteration 1



- Missed **alignment of technology** to achieve the intended learning objectives;
- Challenges in **setting up a learning activity** that involves technology, e.g. improper setting up of a word cloud question on Mentimeter; and
- Missed chance of **peer learning and collaboration** from the rest of the workshop participants, that is, participants from other groups.

We thought of implementing **Collaborative Teaching Strategies** in Iteration 2

DBIR Cycle 1 - Iteration 1



Selection Criteria

1. Those who had participated in Study 1;
2. Those who had managed to use the knowledge from CW1 into their contexts;
3. Intrinsic motivation for participating in CW2 (focusing on interest in learning, application of knowledge); and
4. Knowledge of ICT tools in teaching and learning (knowledge of some computer applications).

11 participants joined qualified to join CW2 as LAs

DBIR Cycle 1 - Iteration 2

Problem Analysis

Literature on collaborative teaching techniques for improving technology integration

Co-teaching: a strategy that involves two or more teachers to deliver instructions to a diverse group of students (Bell, 2007)

Different approaches: one teacher, one assistant; station teaching; parallel teaching; alternative teaching and team teaching

Lesson Study: an approach in which teachers work together to plan, develop and conduct a lesson; while one teacher collects evidence on students' learning (Lewis, 2009).

Challenge: more time is required when planning a lesson, and the need for more than one teacher to teach a lesson (Kanellopoulou & Darra, 2019)

Microteaching: lesson in a short time (5-20mins) , with few objectives, with few students (3-5) (Allen, 1967)

Advantage: Allows evaluation of knowledge shared by their peers, supervisors and participating students

DBIR Cycle 1 - Iteration 2

Problem Analysis

Literature on collaborative teaching techniques for improving technology integration

Solution Design and Development

Workshop Design

Microteaching: less time needed to teach a lesson

Design the workshop and incorporate microteaching sessions

MICROTEACHING PHASE

1. Teachers from the same domain work collaboratively on an ICT integration activity. They select a short lesson.
2. They create a Technology-enhanced lesson plan showing all the components from A2I phases (LO, IS, activities, AS)
3. They operationalize Step 2 in a PowerPoint presentation
4. One of the group member teaches the lesson for 15-20 minutes
 - The rest of the participants become “students”
5. The group receives feedback from the Master Trainer and Participants



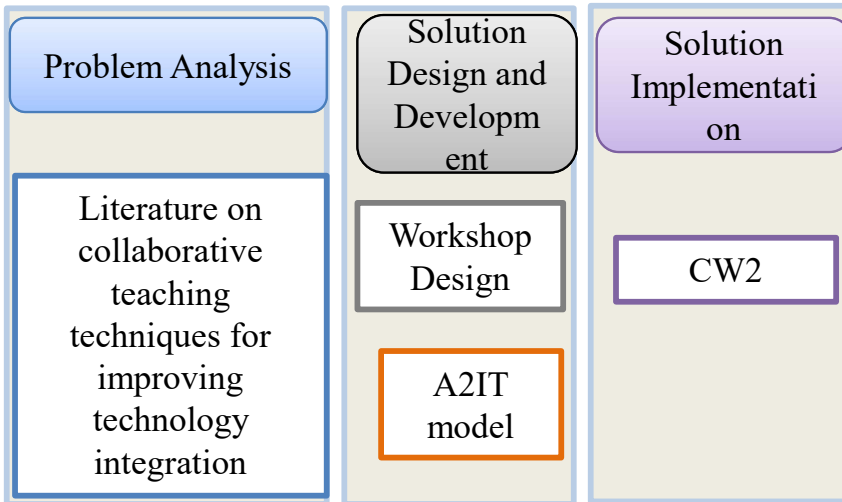
DBIR Cycle 1 - Iteration 2

	Attain Phase	Align Phase	Integrate Phase	Teach Phase
Goal	Introduce participants to the idea of student-centeredness	Align strategies with student learning goals while using tech	Technology integration design through constructive alignment of IS, LO and AS	Teach a technology integrated topic to participants
Coverage	Introduce the 4 components: IS, LO, AS and tech	Increased depth in coverage of contents	Depth is the largest	Depth is on technology tool
Nature	Instructor-driven	Participant driven for mastery (individual)	Participant-driven (Collaborative)	Teacher - Driven
Participant	Active learner	Practices individually	Works on a collaborative activity to integrate technology in a lesson they teach	Collaborative planning, design and teaching

A2I+Teach phase

A2IT

DBIR Cycle 1 - Iteration 2

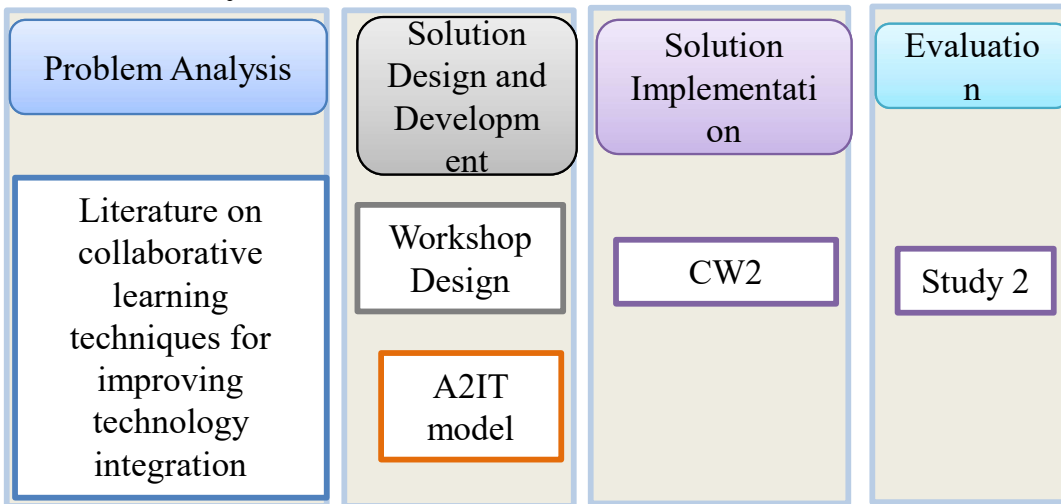


- Workshop in June 2019
- Kola Hill Sec School and Dodoma Sec School
- 26 Participants (Learners)
- 11 LAs
- MT
- Worked in groups of 4-5

Final Activity

- Each group to **operationalize a technology-enhanced lesson plan** through a microteaching

DBIR Cycle 1 - Iteration 2



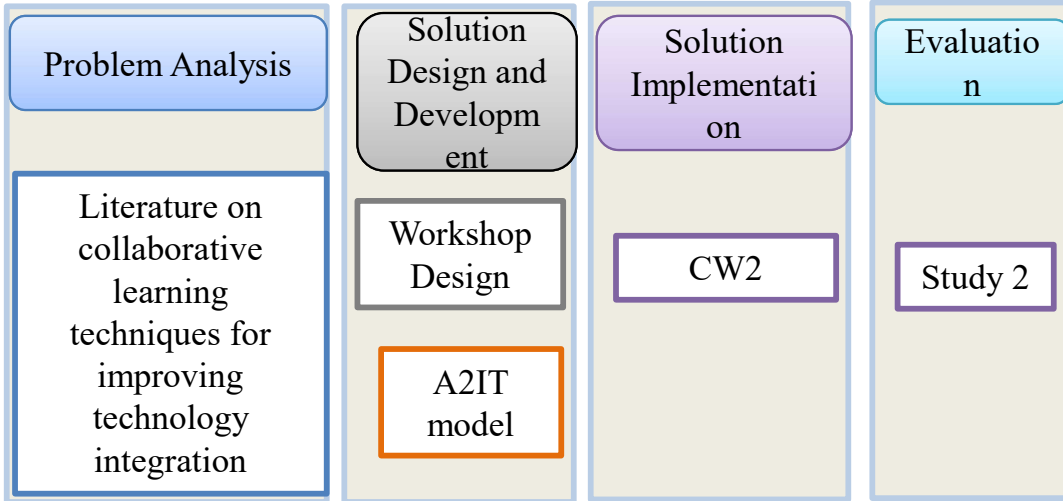
Research Questions

1. How well are teachers **aligning technology** to the learning objectives during microteaching?
2. How confident are teachers in technology tools in their teaching practices and sharing with other teachers?
3. How do teachers perceive the role of a microteaching session in teacher training?
4. What modifications to the model would make effective transfer of workshop content to other teachers?

Results for RQ1

- 4 of all the 6 groups aligned technology tools into their lesson plan during their microteaching session.
- The remaining 2 groups created questions using technology but **could not display results** or selecting the right question type to set in the technology tool

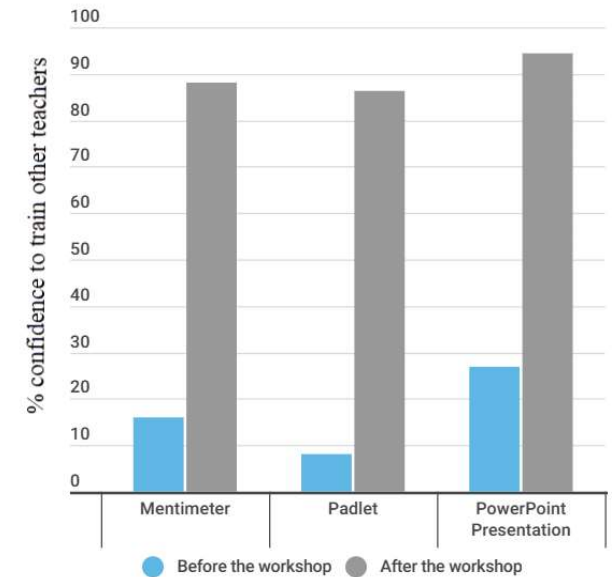
DBIR Cycle 1 - Iteration 2



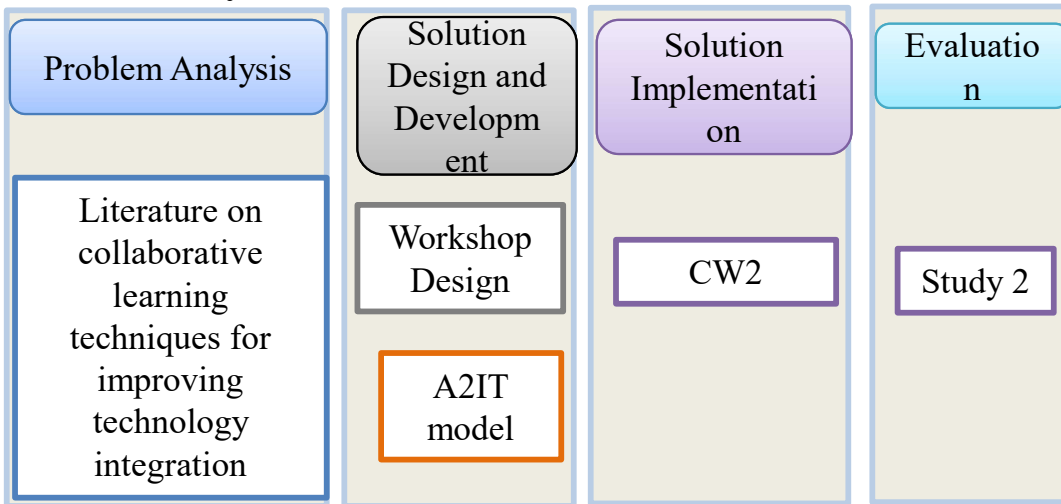
Research Questions

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3. How do teachers perceive the role of a microteaching session in teacher training?
4. What modifications to the model would make effective transfer of workshop content to other teachers?

Results for RQ2



DBIR Cycle 1 - Iteration 2



Results for RQ3

Research Questions

1. How well are teachers aligning technology to the learning objectives during microteaching?
2. How confident are teachers in technology tools in their teaching practices and sharing with other teachers?
3. How do teachers perceive the role of a microteaching session in teacher training?
4. What modifications to the model would make effective transfer of workshop content to other teachers?

Learning from others

"I was able to learn from others, able to assess strength and weakness and finally discuss with others so as to improve my session".

Lesson preparation

"How to get well prepared before, how to integrate students in teaching and learning process and also how to evaluate the learning process"

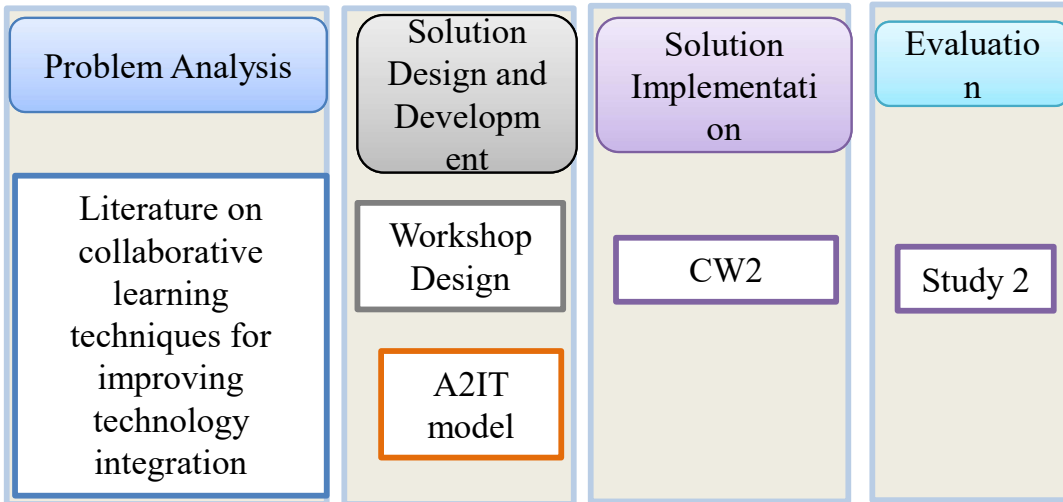
Collaboration

"I learnt a lot in that session. How do the teachers collaborate with their class, why confidence is crucial in the T/L process, how to use technology in an appropriate and specific time. It was not only enjoyable but fantastic"

Improved confidence

"How possible for a teacher to teach in a confident way that helps the classroom to understand well. How to answer well students' questions".

DBIR Cycle 1 - Iteration 2



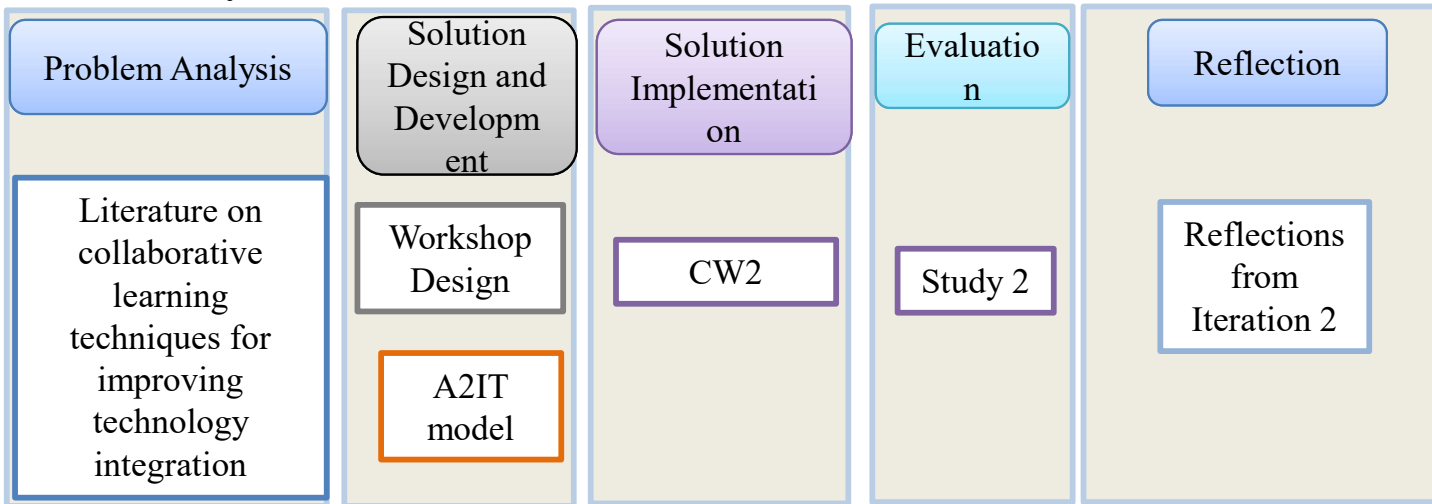
Results for RQ4

Research Questions

1. How well are teachers aligning technology to the learning objectives during microteaching?
2. How confident are teachers in technology tools in their teaching practices and sharing with other teachers?
3. How do teachers perceive the role of a microteaching session in teacher training?
4. What modifications to the A2IT model would make effective transfer of workshop content to other teachers?

Theme	Teachers' voices
Improve Confidence	"Teachers are required not to fear teaching their classes wherever they get chances to do so. Teachers are required to adhere to and participate in teaching wherever they are required without fear or feeling shy"
Participant's feedback	"Participants should admit their strengths and areas of improvements openly because in most instances people tend not to admit their shortcomings"
Time management	"Time management should be adhered to by every presenter from groups"

DBIR Cycle 1 - Iteration 2

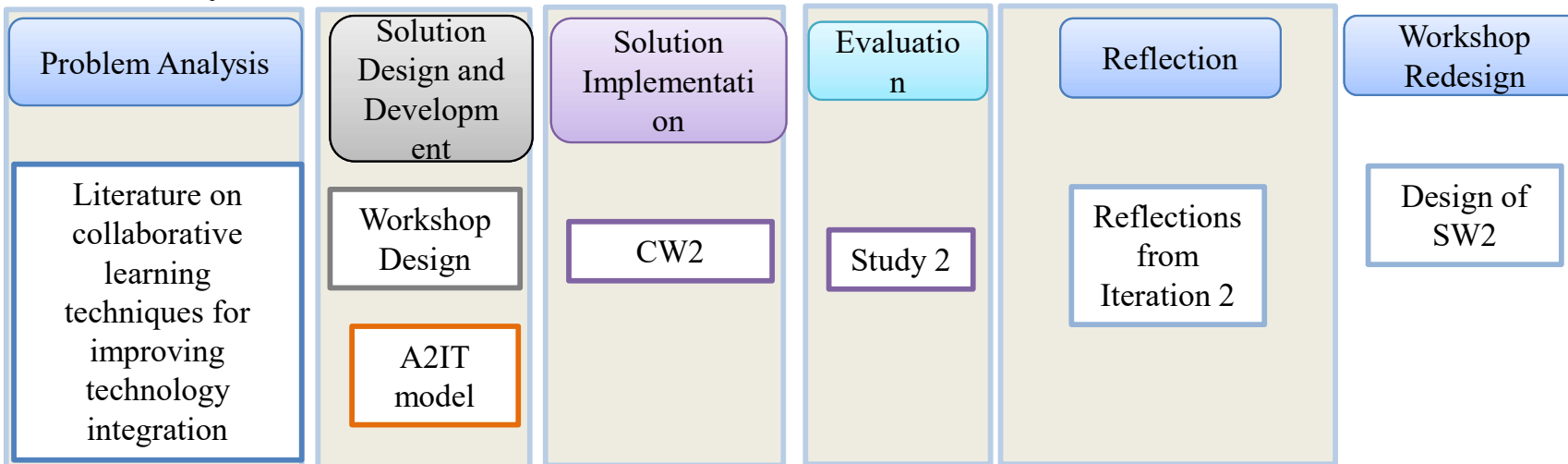


During Microteaching presentations

- Fear and shyness during microteaching
- Less confident in front of other teachers
- Need for more facilitators during workshop

- Identify relevant skills to improve confidence
- Need for training skills to LAs

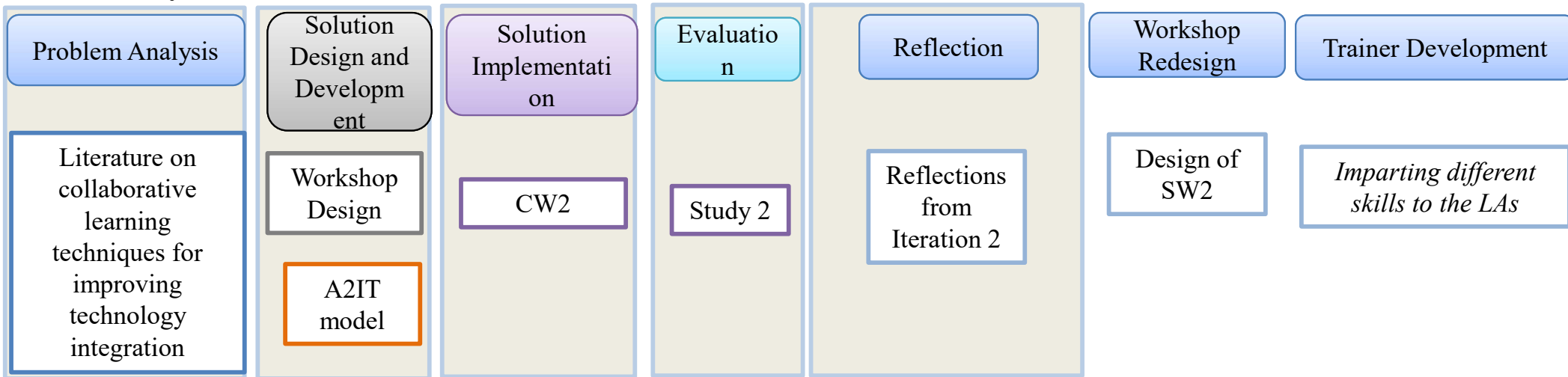
DBIR Cycle 1 - Iteration 2



Design a Skills Workshop

- Determine the skills and attitudes of effective trainers
- Conduct SW to train LAs on the training skills and attitudes

DBIR Cycle 1 - Iteration 2



- LAs to participate in a skills workshop
- LAs to practice the skills workshop

Implementation in DBIR Cycle 2

DBIR Cycle 2

Iterations 3 and 4

DBIR Cycle 2 - Iteration 3

Problem Analysis

Literature
Review on
Skills for
trainers

Literature Review Qn	Findings
LRQ1: What skills do trainers need to become effective?	<ul style="list-style-type: none"> • Effective communication skills (Ibrahim et al, 2019) • Questioning skills (Galbraith, 1998) • Listening skills (Stolovich,1999) • Observation skills (Wragg, 2011) • Providing feedback (Wlodkowski,1993)
LRQ2: What are features of teachers as trainers?	<ul style="list-style-type: none"> • PCK, experience in training, Good understanding of participants • Self-regulation of emotions (Ram, 2015)

DBIR Cycle 2 - Iteration 3

Problem Analysis

Literature Review on Skills for trainers

Solution Design and Development

SW1 Design

Blended workshop

Online Activities on Moodle

1. Needs analysis
2. Content adaptation
3. Question formation
4. Observation skills

F2f module

1. Recap of online activities
2. Adult learning principles
3. Planning, conducting and evaluating training

DBIR Cycle 2 - Iteration 3

Problem Analysis

Literature
Review on
Skills for
trainers

Solution Design and Developm ent

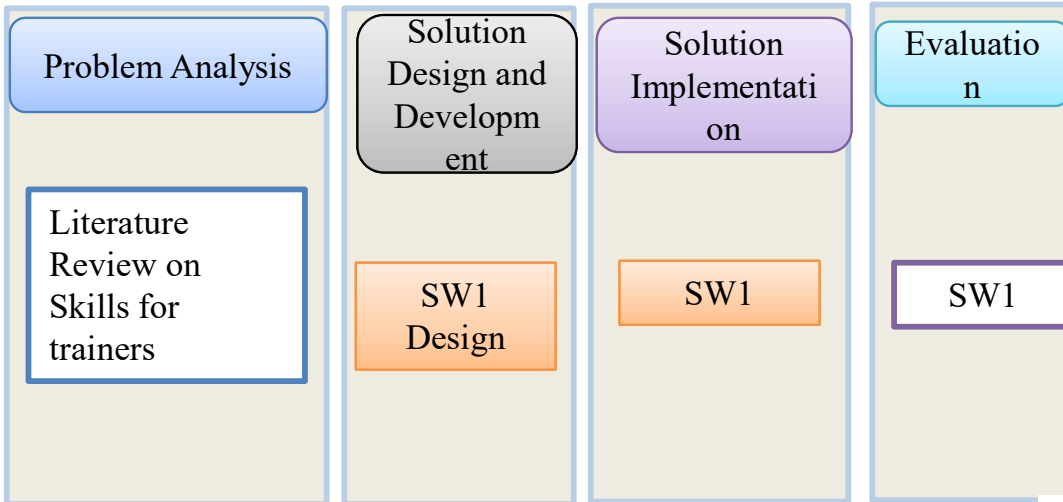
SW1
Design

Solution Implementati on

SW1

- Workshop in December 2019
- Delivery:
 - Online for 7 days;
 - Face to face for 2 days
- 11 LAs
- MT

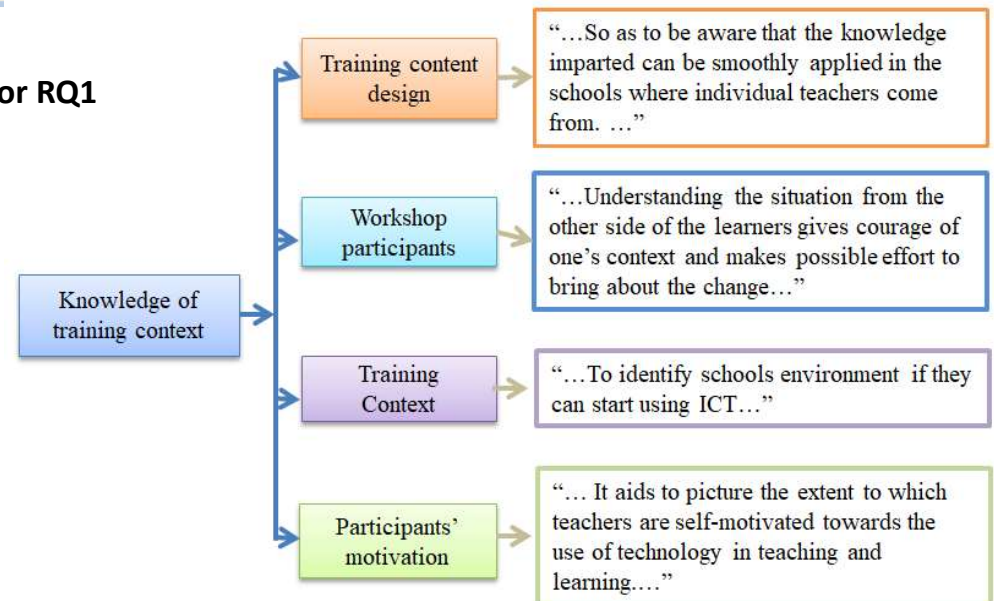
DBIR Cycle 2 - Iteration 3



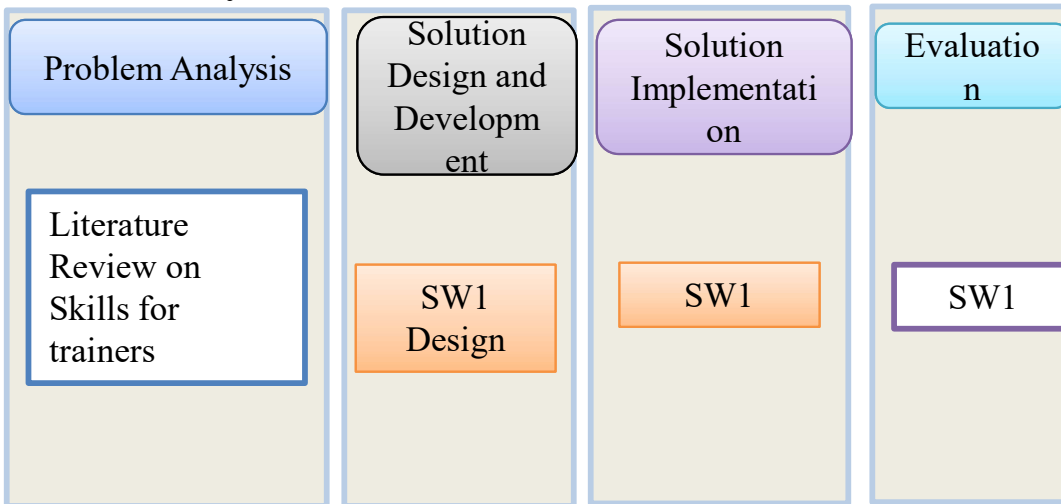
Research Questions

1. How do LAs perceive the usefulness of participant details?
2. How effective are workshop participants in making observations?
3. What is the experience of conducting training by experienced teacher trainers?

Results for RQ1



DBIR Cycle 2 - Iteration 3



Research Questions

1. How do LAs perceive the usefulness of participant details?
2. How effective are LAs in making observations?
3. What is the experience of conducting training by experienced teacher trainers?

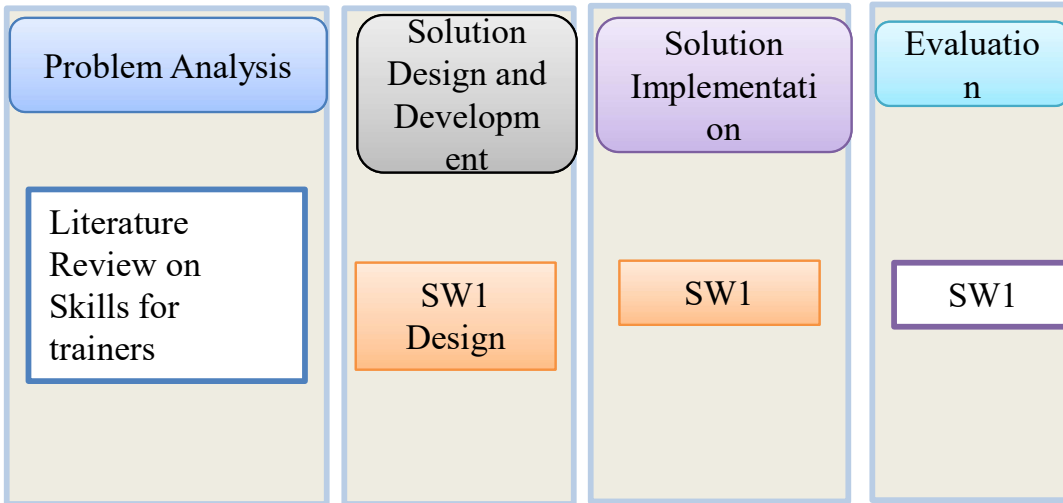
Results for RQ2

"...I would advise the trainer to ask more interactive question and specific questions..."

"...The trainer was supposed to go around the class to attract attention to the trainees..."

"...Instead of only explaining since the area/class has desktops he was supposed to show the Microsoft Word and Microsoft Excel application software..."

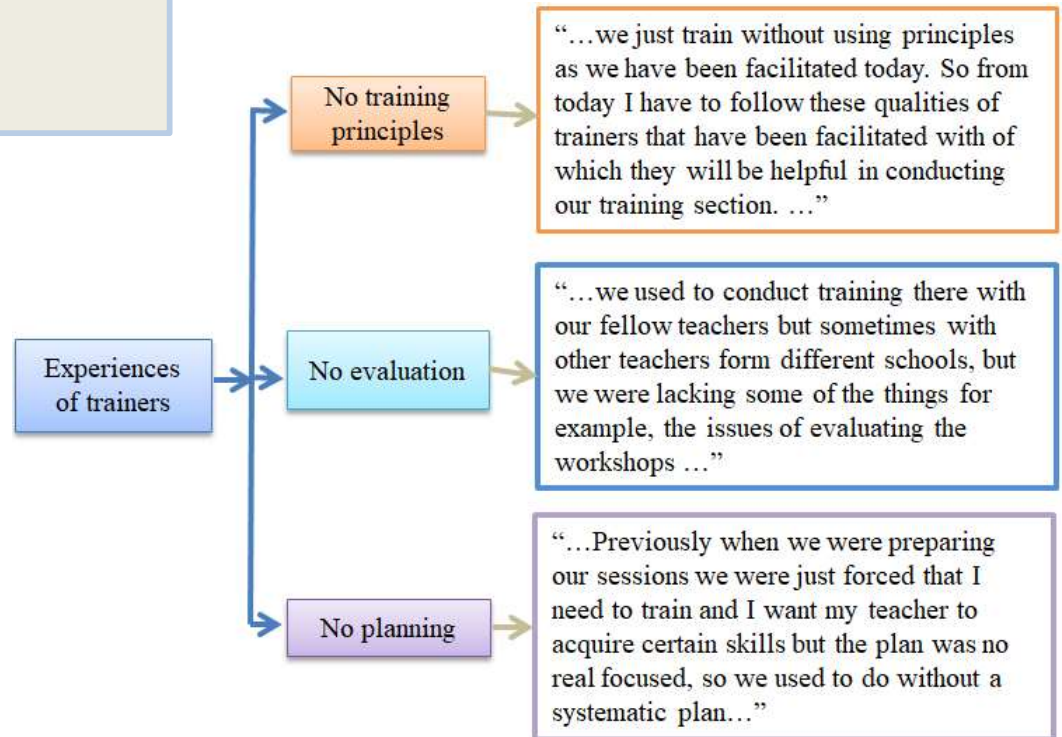
DBIR Cycle 2 - Iteration 3



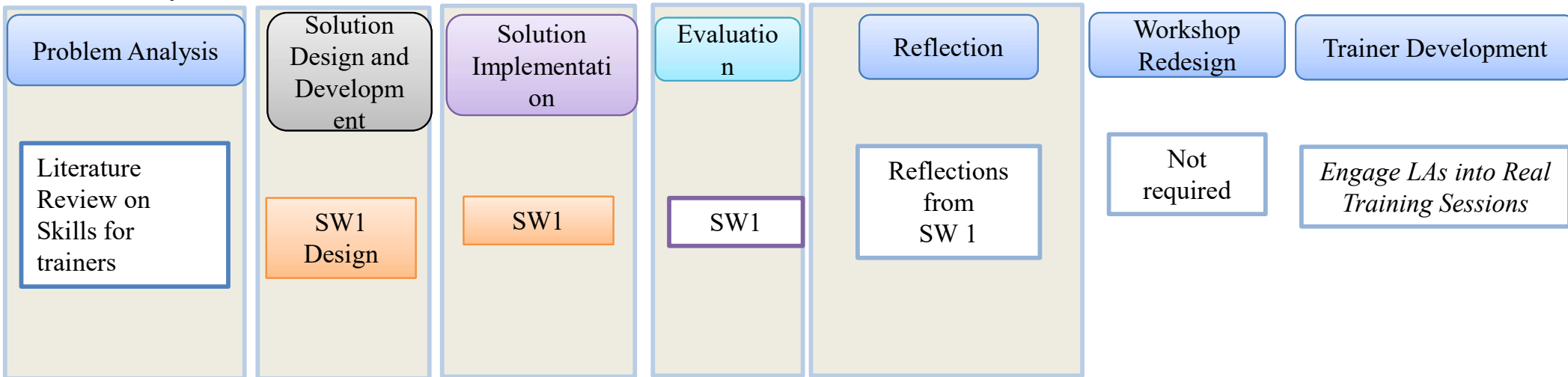
Research Questions

1. How do LAs perceive the usefulness of participant details?
2. How effective are workshop participants in making observations?
3. What is the experience of conducting training by experienced teacher trainers?

Results for RQ3



DBIR Cycle 2 - Iteration 3



Research Goal:

To engage LAs as co-trainers in teacher training session to apply the skills from SW1

TRAIN Phase

$A2IT+T=A2IT2$

Selection of LAs to CW2

1. Prior teacher training experience
2. Completion and submission of the four online activities
3. Availability to train others during the next workshop
4. Confidence level to conduct a small CW3 session

4 Learning Assistants qualified

DBIR Cycle 2 - Iteration 3

Problem Analysis

Literature
Review on
Skills for
trainers

Solution
Design and
Developm
ent

Workshop
Design

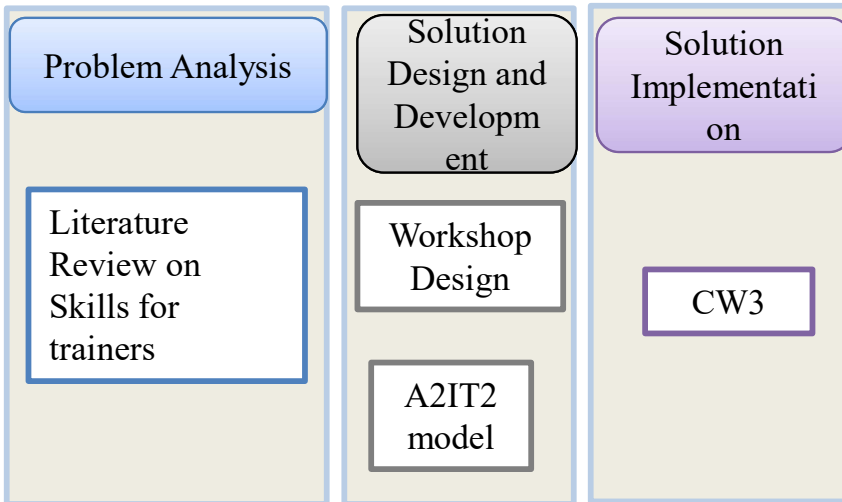
A2IT2
model

Same workshop as CW2

DBIR Cycle 1 - Iteration 2

	Attain Phase	Align Phase	Integrate Phase	Teach Phase	Train Phase
Goal	Introduce participants to the idea of student-centeredness	Align strategies with student learning goals while using tech	Technology integration design through constructive alignment of IS, LO and AS	Teach a technology integrated topic to participants	Practical implementation of specific portion of the training content
Coverage	Introduce the 4 components: IS, LO, AS and tech	Increased depth in coverage of contents	Depth is the largest	Depth is on technology tool	30-50% of the training content
Nature	Instructor-driven	Participant driven for mastery (individual)	Participant-driven (Collaborative)	Teacher - Driven	<ul style="list-style-type: none"> °Content modification °Workshop planning and designing °Facilitating the session
Participant	Active learner	Practices individually	Works on a collaborative activity to integrate technology in a lesson they teach	Collaborative planning, design and teaching	Co-Trainer

DBIR Cycle 2 - Iteration 3

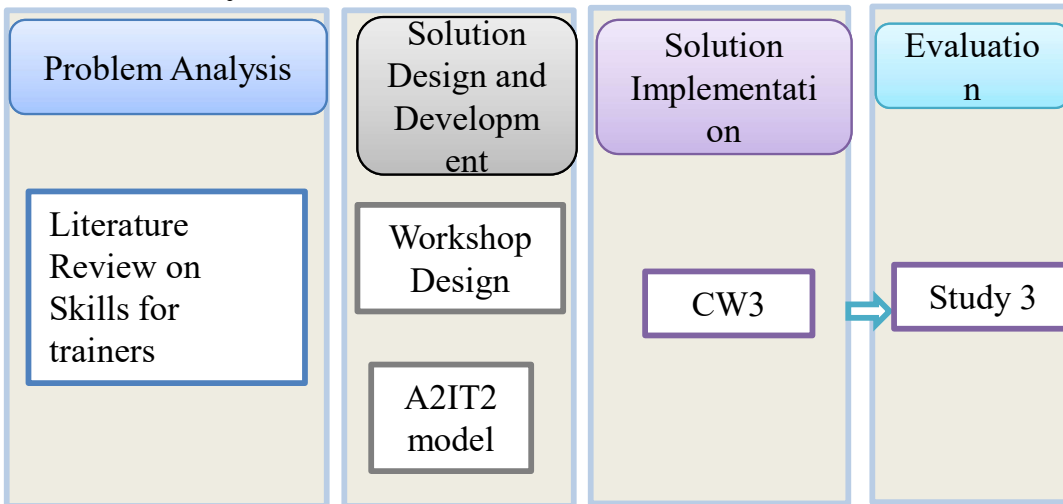


Session taken by each CoT

- Workshop in Jan 2020
- In Mwanza City
- 35 Participants
- 4 CoTs
- MT
- Worked in groups of 4-5

Co-trainers' Initials	Session Taken	Time Trained	Day
CT1	Using Mentimeter in Teaching and Learning	90 minutes	Day 1
CT2	Creating Peer Instruction Questions	80 minutes	Day 1
CT3	Using Padlet in Teaching and Learning	90 minutes	Day 2
CT4	PowerPoint Presentations for Teachers	60. Minutes	Day 3

DBIR Cycle 2 - Iteration 3



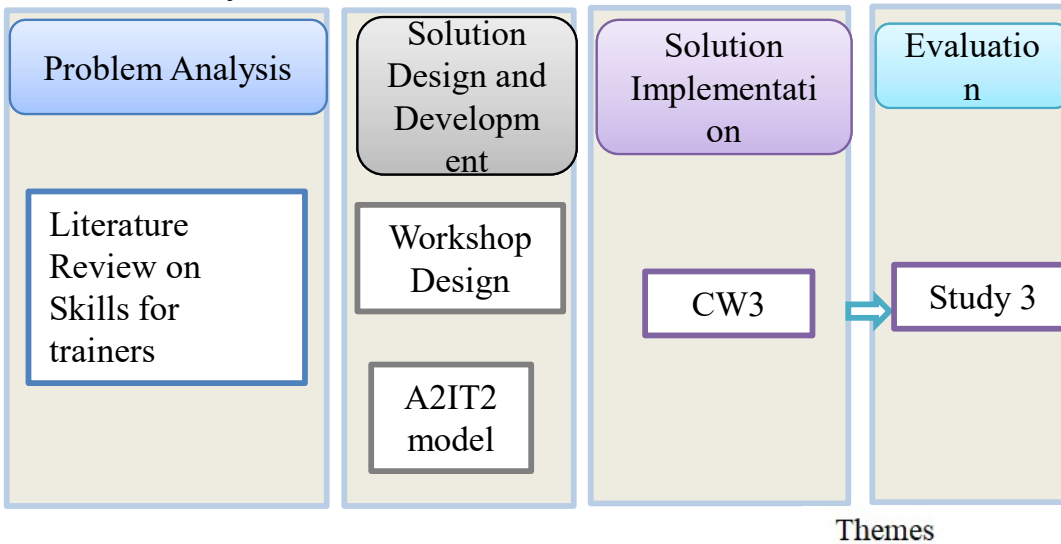
Research Questions

1. What are the perceptions of participants on the session taken by a co-trainer?
2. What are co-trainers' lessons from the sessions they took?
3. What modifications do co-trainers need to improve their training sessions?

Results for RQ1

Co-trainer	Enthusiasm	Confidence	CK	Delivery
CT1	High	Medium	Excellent	Engaging but not engaging both sides
CT2	High	High	Excellent	Engaging
CT3	High	High	Excellent	Engaging
CT4	High	Medium	Excellent	Limited learner engagement

DBIR Cycle 2 - Iteration 3



Results for RQ2

Research Questions

1. What are the perceptions of participants on the session taken by a co-trainer?
2. What are co-trainers' lessons from the sessions they took?
3. What modifications do co-trainers need to improve their training sessions?

Prior knowledge

"First what I have learnt most is on how to adapt material according to the actual environment that I can stand and teach on the audience context"

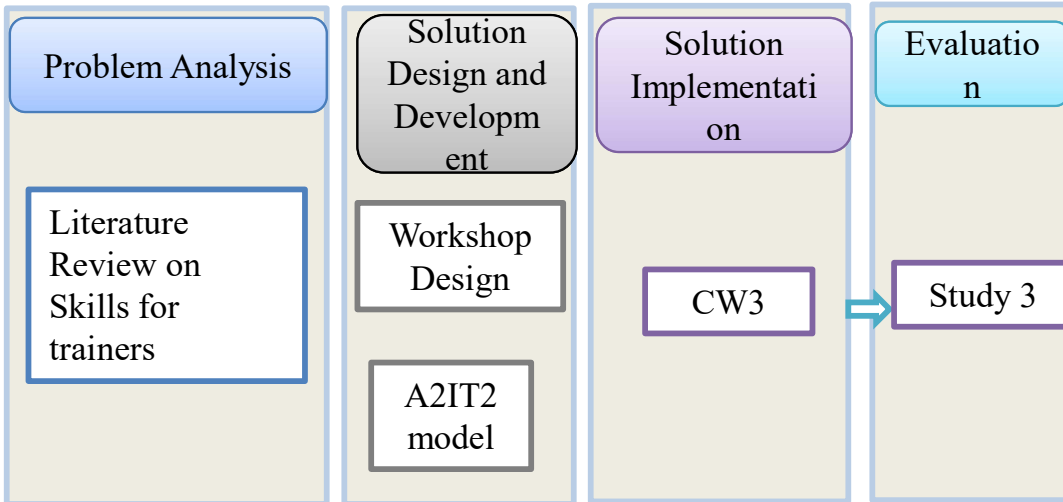
Team support

"Not only that, but I am also happy with cooperation that becomes like a team teaching. When it reaches a time you want to mess-up, people will be eager to correct you. So, if you have forgotten something, others contribute by adding some additional points"

Mentor Support

"There has been good academic discipline to the extent of putting clear every academic issue. For example, one person asked on Google classroom, I don't remember who presented, so you are the one who had good knowledge on this, you answered it instantly. So, this showed no gap to be left, we had good cooperation"

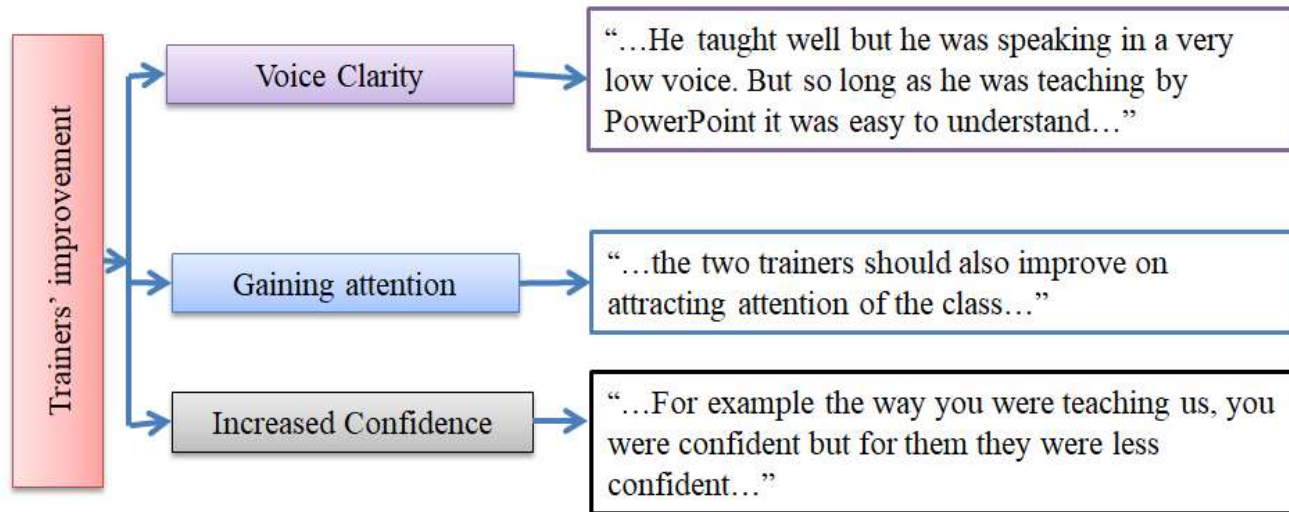
DBIR Cycle 2 - Iteration 3



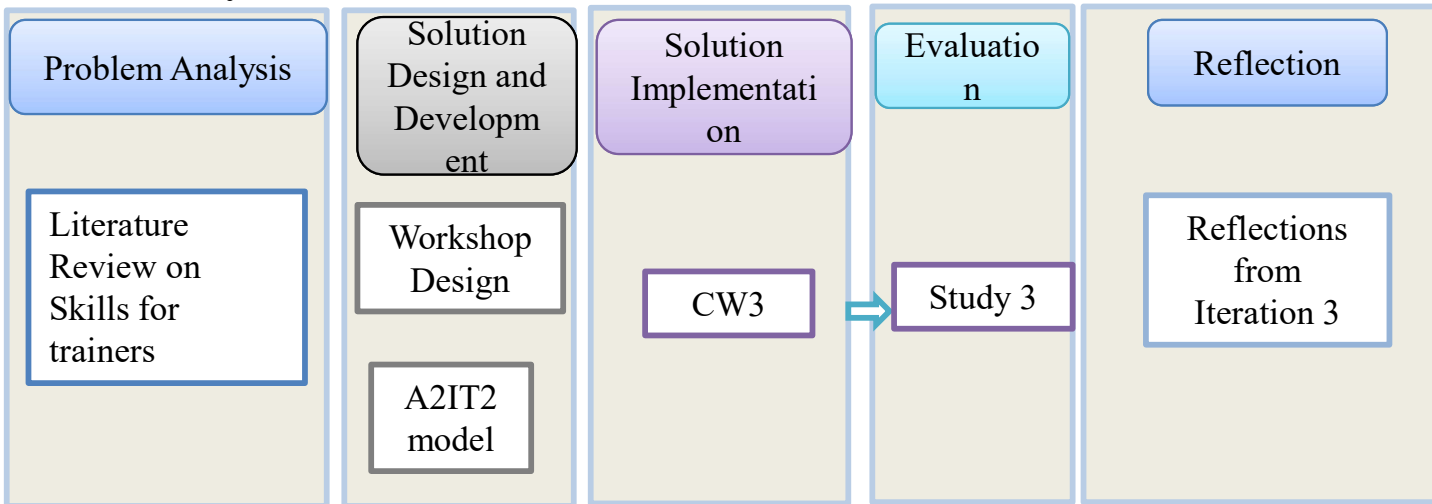
Results for RQ3

Research Questions

1. What are the perceptions of participants on the session taken by a co-trainer?
2. What are co-trainers' lessons from the sessions they took?
3. What modifications do co-trainers need to improve their training sessions?



DBIR Cycle 2 - Iteration 3

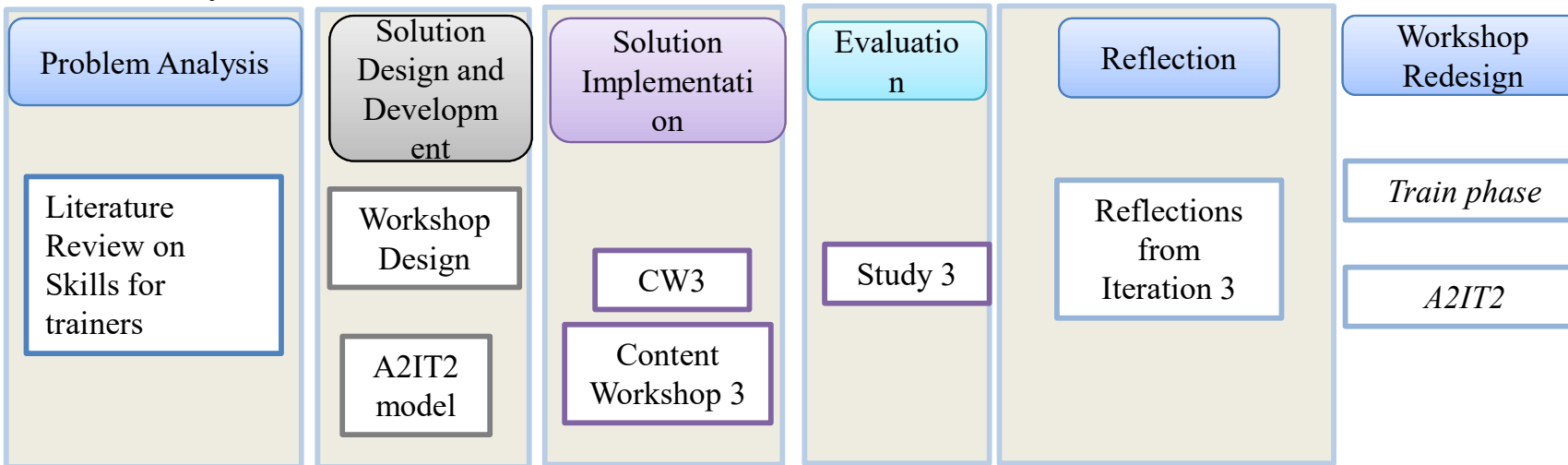


From Data Analysis

- Low voice, monotone
- Less **confidence** in front of the teachers
- Improving **presentation skills**

Improvement Needed	Refinement Implemented
Skills to improve confidence	Skills workshop SW2
Practice of teacher training	Full teacher training session during CW4a

DBIR Cycle 2 - Iteration 3

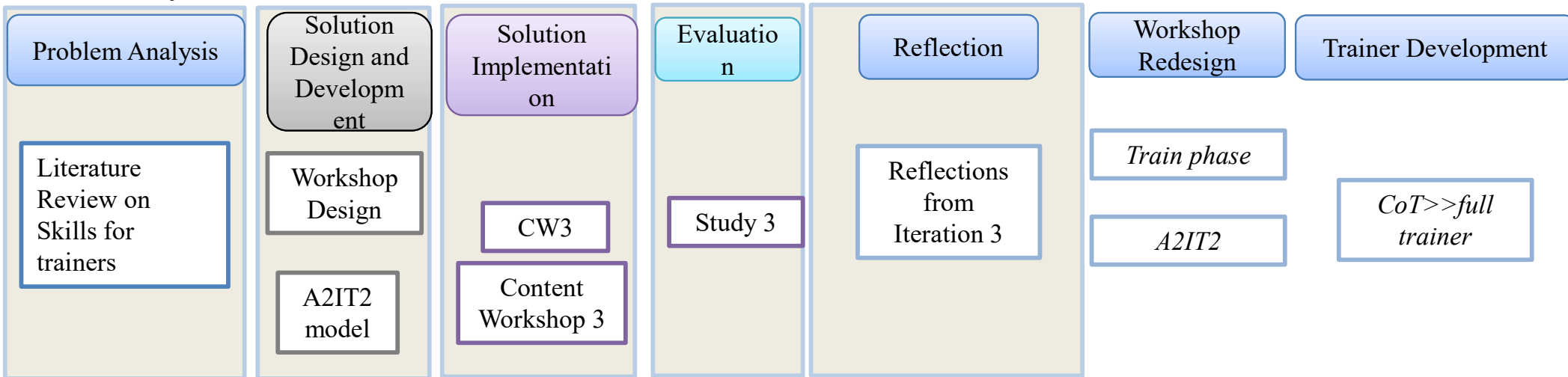


Need for imparting skills to improve confidence

Research Goal:

- To prepare co-trainers for individual training sessions by equipping them with the relevant planning, executing and evaluation skills

DBIR Cycle 2 - Iteration 3



From Co-trainer to a full individual trainer
Who can plan, conduct and evaluate a workshop

DBIR Cycle 2 - Iteration 4

Problem Analysis

Literature Review
on developing
competencies for
trainers

Literature Review	Findings
LRQ: What determines an effective teacher training session?	<ul style="list-style-type: none">• Pedagogical knowledge of the area, Rich experience• Facilitation skills (Ram, 2015)• Effective Presentation Skills (Leach, 1996)• Listening skills (Stolovich,1999)

DBIR Cycle 2 - Iteration 4

Problem Analysis

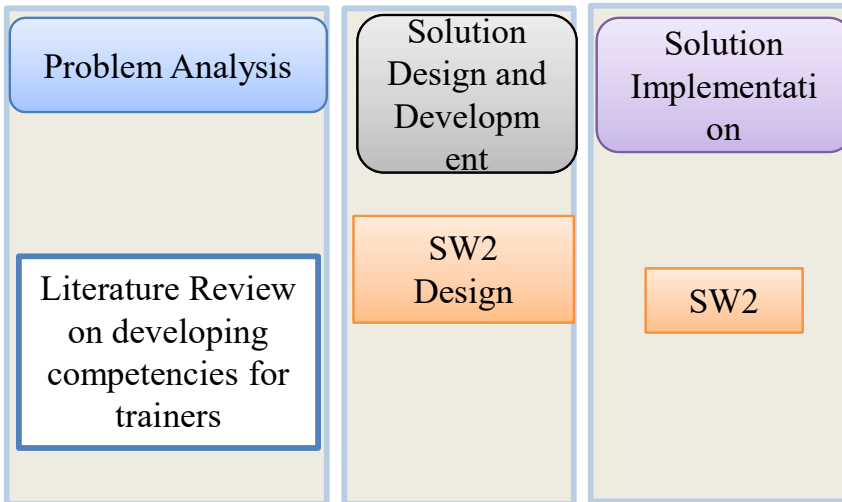
Solution
Design and
Developm
ent

Literature Review
on developing
competencies for
trainers

SW2
Design

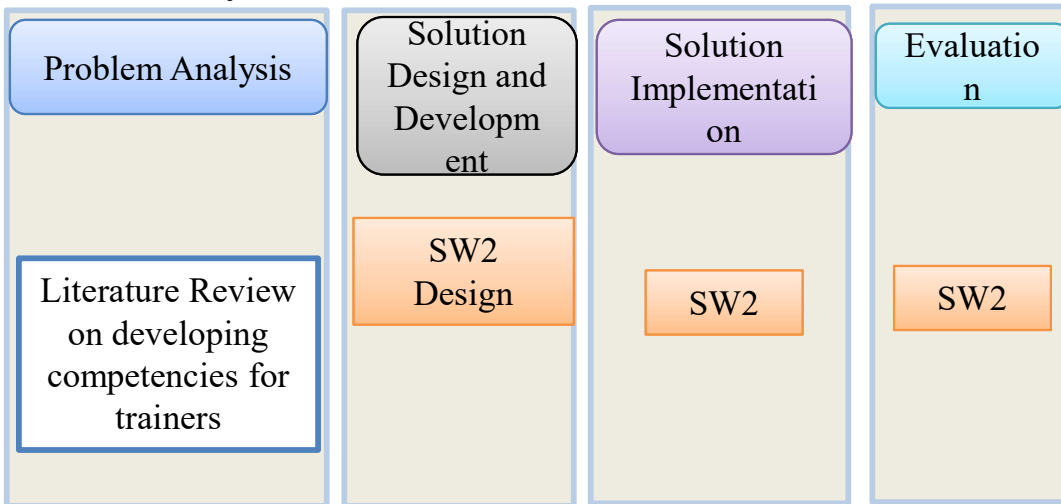
SW2 Content
Opening a Training Session
Activity Design Skills
Presentation Skills
Communication Skills
Facilitation Skills
Training Management Skills

DBIR Cycle 2 - Iteration 4



- Workshop in August 2020
- Full online via Google Meet
- 4 CoTs
- MT

DBIR Cycle 2 - Iteration 4



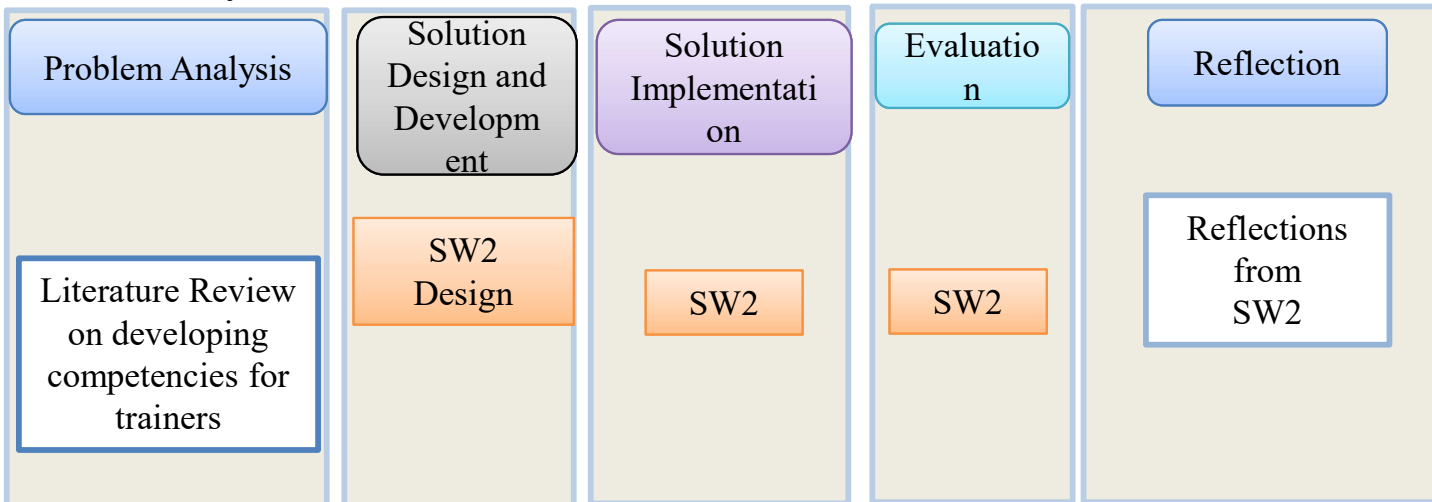
Research Question

How do co-trainers' training approaches change after the skills workshops?

DBIR Cycle 2 - Iteration 4

Co-Trainer	Theme	Response
CT1	Needs Evaluation	“I used to fear that some participants are ahead of me with knowledge I want to facilitate that will challenge me, this online workshop assisted me to do a pre survey in which I will know the participants and ready to use them during actual presentation”.
CT2	Participant Engagement	“I feared that there might be participants who were knowledgeable on the topics than I was, but through the online workshop I learned that having that kind of participants might help to hasten the engagement of the participants”.
CT3	Confidence	“One spotted fear was that of how could I manage to handle them in terms of my classroom presentation, my general confidence was low. But after the training I became sure of everything anyway, I knew then how confidence can be created from a clearly prepared training”.
CT4	Workshop Management	“A very big fear I had was how I could conduct and manage a very big training session of about 39 teachers but this workshop ensured me much in keeping calm all classroom situations and fears through using different training skills such responding positively to all trainers' responses, using some probing clues which help to show your direct credibility and presence”.

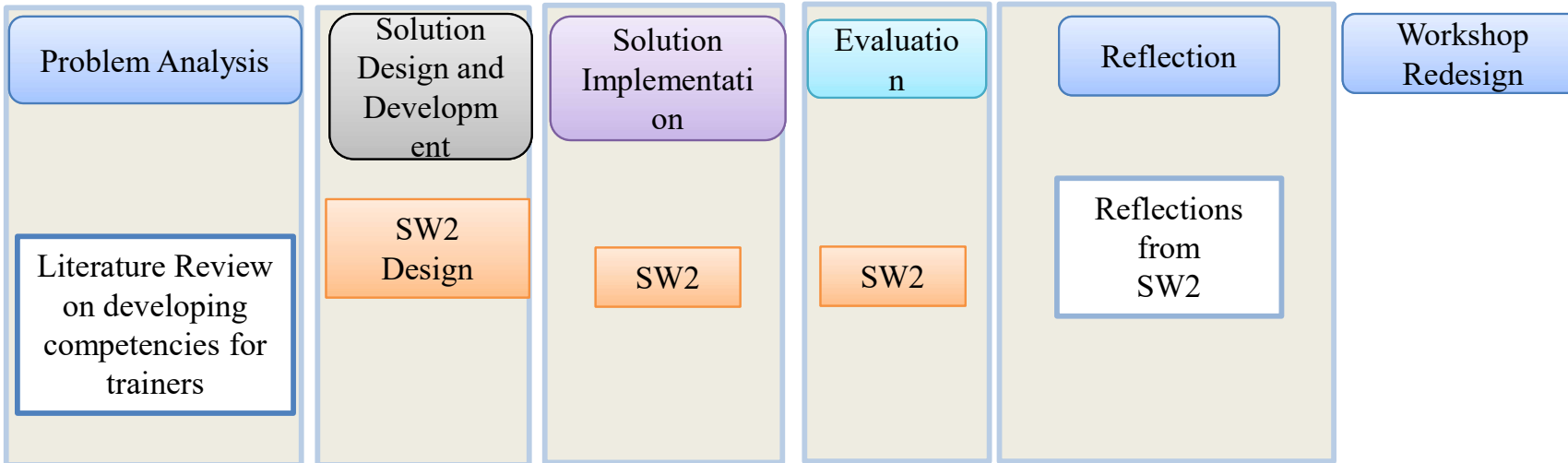
DBIR Cycle 2 - Iteration 4



After SW2, co-trainers exhibited **an increase in confidence** to design, conduct and evaluate teacher training sessions.

*“...Now I will change to have **a complete planning** and a long time for pre-preparations of my trainings. I will prepare required **training assessment activities** as well as its **evaluating tools**, and have a clear monitoring schedule to assure training sustainability”.*

DBIR Cycle 2 - Iteration 4

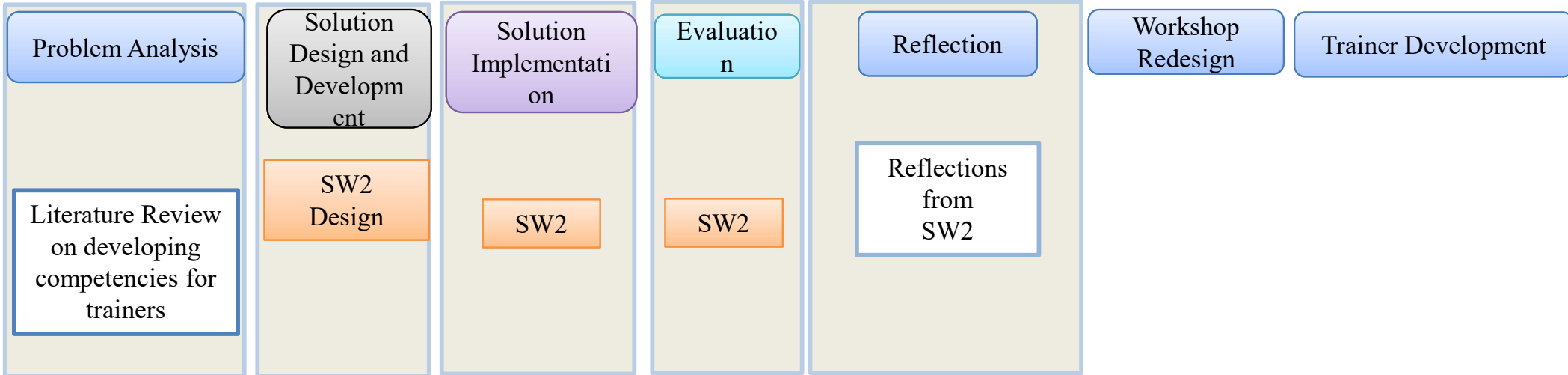


A need to [apply the skills learnt in SW2](#) in an actual training setting involving teachers as participants.

[Full training sessions](#) were planned for two of the co-trainers to exercise the skills.

The workshop sessions for each of the co-trainers are explained as [CW4a](#) and [CW4b](#) respectively.

DBIR Cycle 2 - Iteration 4



From Co-trainer to Full Trainer

To plan, conduct and evaluate teacher training sessions

DBIR Cycle 2 - Iteration 4

Problem Analysis

Solution
Design and
Developm
ent

Workshop
Design

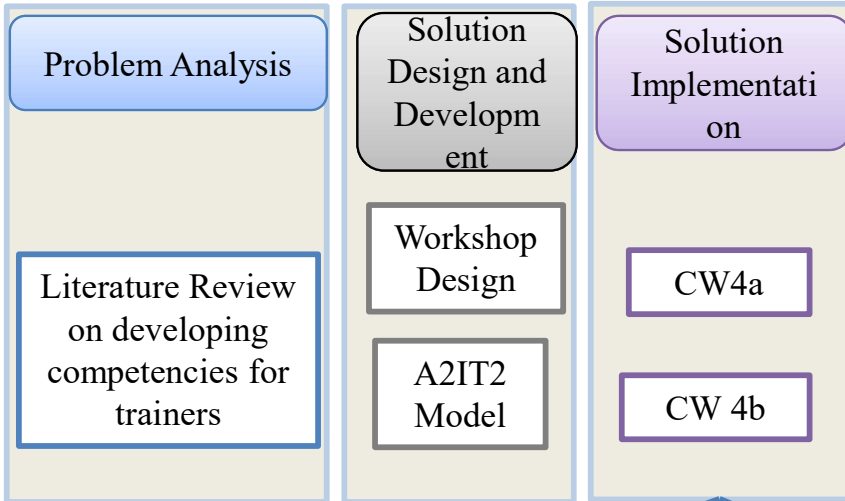
A2IT2
Model

Involves 2 of the 4 developed trainers

Both designed using A2IT2 Model

Different time, context and audience

DBIR Cycle 2 - Iteration 4



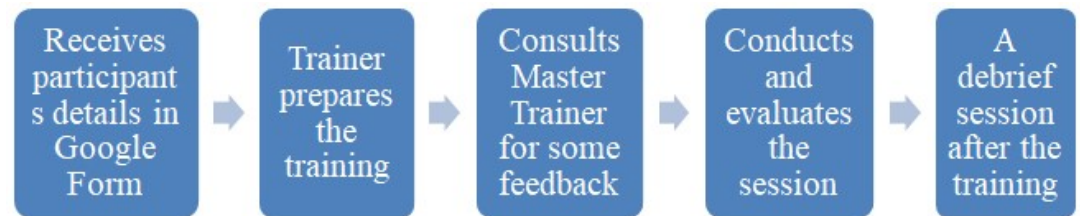
Trainer 1 (Study 4a)

- August, 2020
- 21 participants
- Forest Hill Sec School
- Different school context

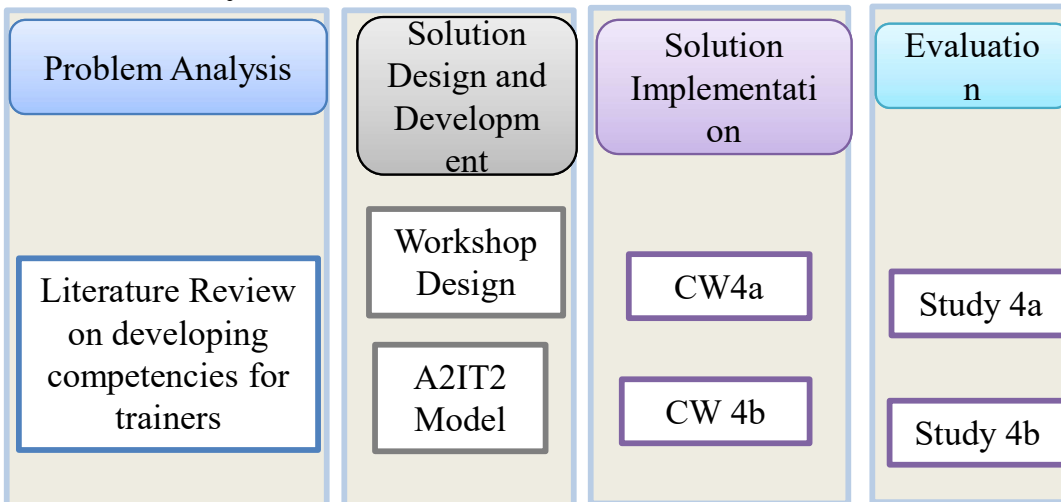
Trainer 2 (Study 4b)

- March, 2021
- 22 participants
- Morogoro Sec School
- Different school context

Trainer preparations



DBIR Cycle 2 - Iteration 4



Same Research Questions

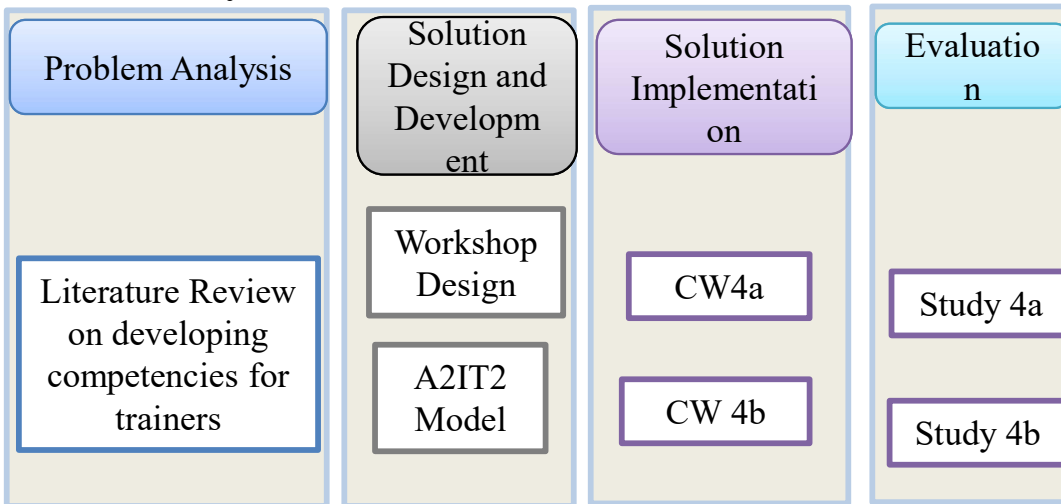
RQ4.1: To what extent do A2IT2-based workshop participants integrate technology tools during a training programme conducted by a full trainer?

RQ4.2: How confident are teachers in using technology tools in their teaching practices?

RQ4.3: What are the features of an effective teacher trainer for an effective teacher training session?

RQ4.4: What are the reflections of the developed trainer from the solo teacher training?

DBIR Cycle 2 - Iteration 4



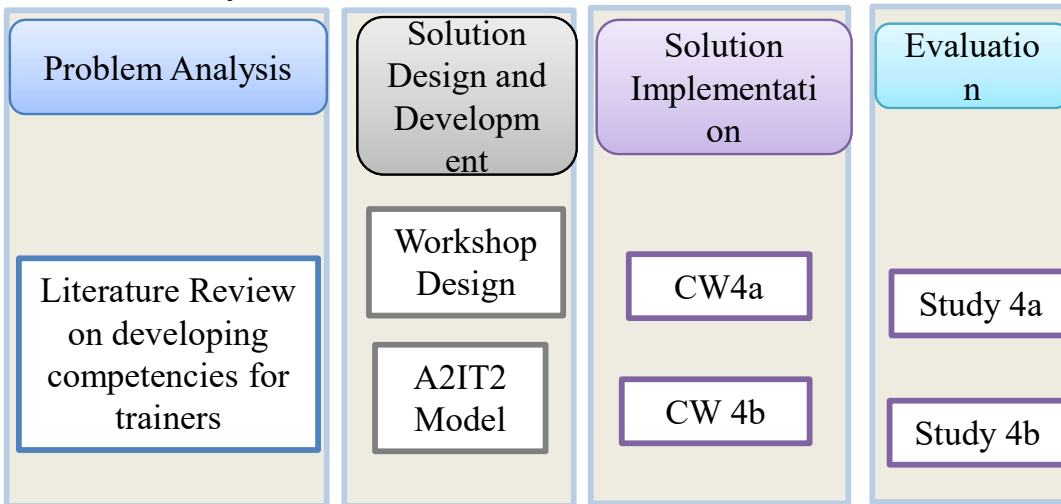
Trainer 1 (4a)

Group	Technology	Comments
G1	M and P	Worked well
G2	M and P	Worked well
G3	M and P	Worked well
G4	M and P	Worked well
G5	M and P	Worked well

Trainer 2 (4b)

Group	Technology	Comments
G1	M and P activities	Worked well
G2	2 padlet activities	Worked well
G3	M and P activities	Worked well
G4	2 mentimeter activities	Worked well

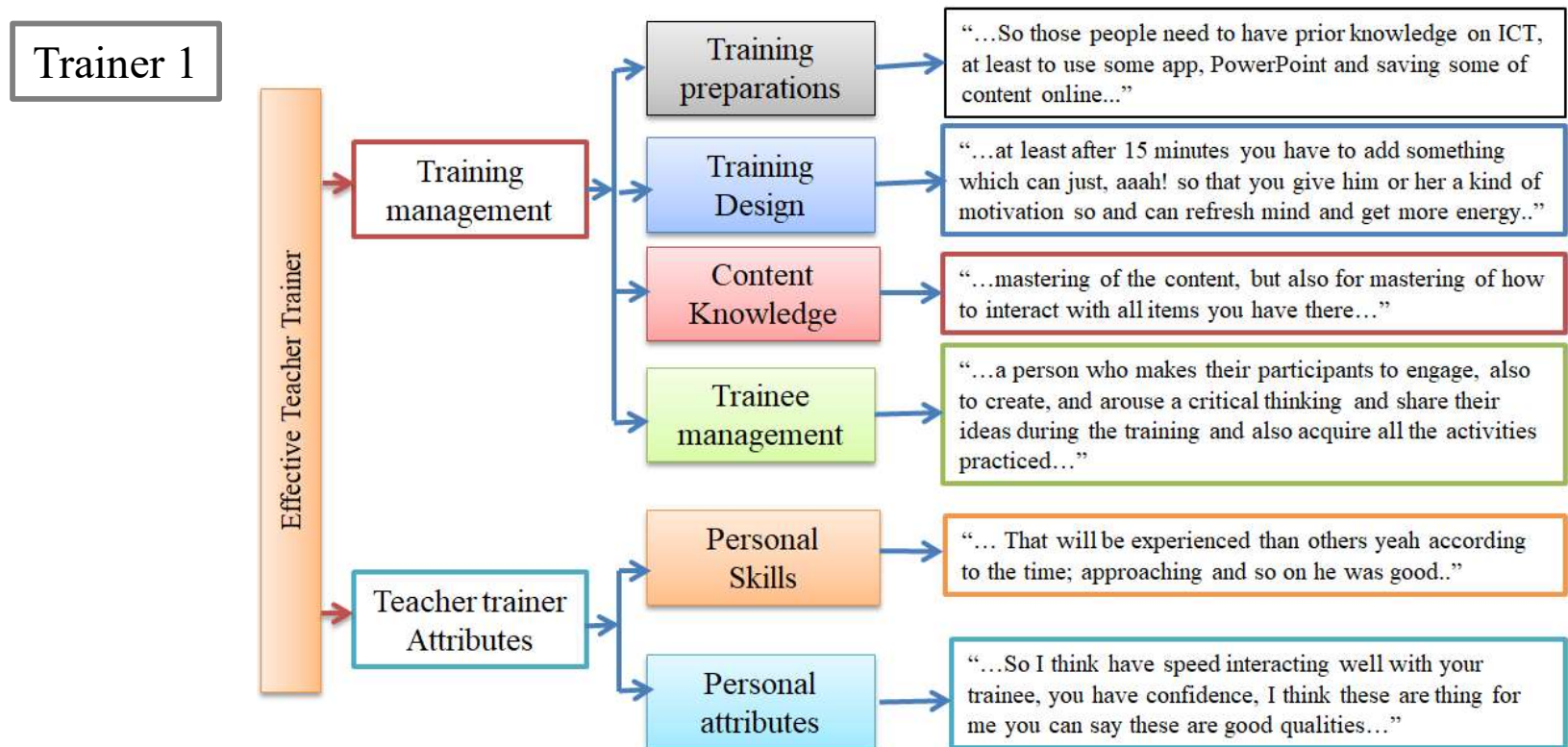
DBIR Cycle 2 - Iteration 4



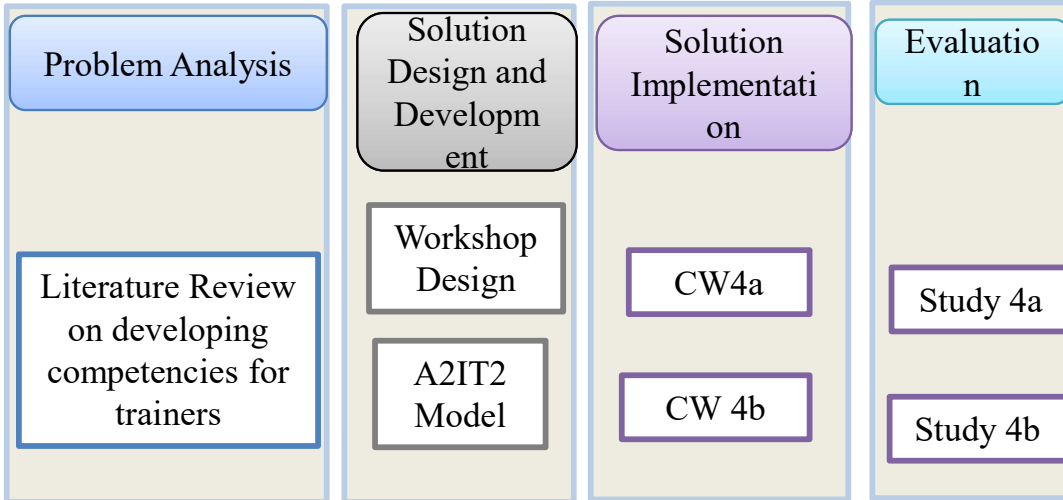
RQ4.2: How confident are teachers in using technology tools in their teaching practices?

Confidence in	Threshold	Study 4a (N=21)	Study 4b (N=22)
Using Mentimeter in teaching and learning	$\geq 70\%$	15(71.4%)	17(77.2%)
	$< 70\%$	6(28.6%)	5(22.8%)
Using Padlet in teaching and learning	$\geq 70\%$	13(61.9%)	16(72.0%)
	$< 70\%$	8(38.1%)	6(28.0%)
Using PowerPoint in teaching and learning	$\geq 70\%$	15(71.4%)	16(72.0%)
	$< 70\%$	6(28.6%)	6(28.0%)

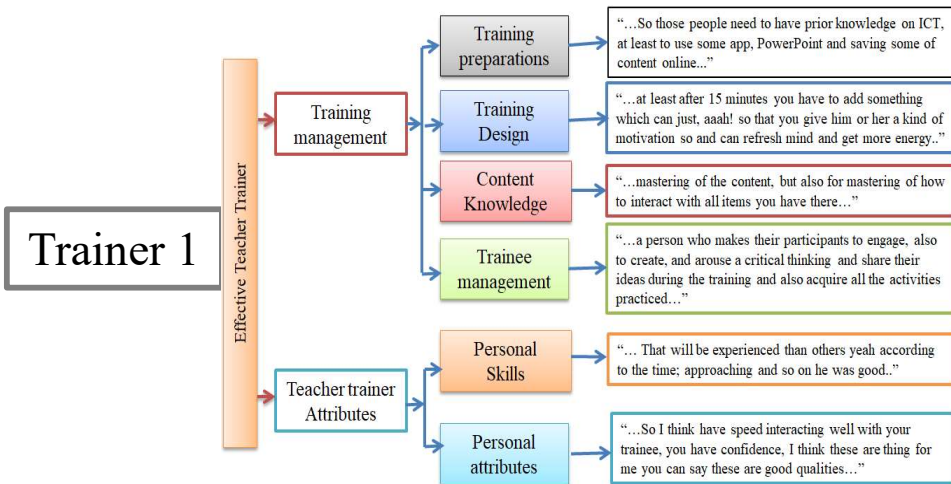
RQ4.3: What are the features of an effective teacher trainer for an effective teacher training session?



DBIR Cycle 2 - Iteration 4

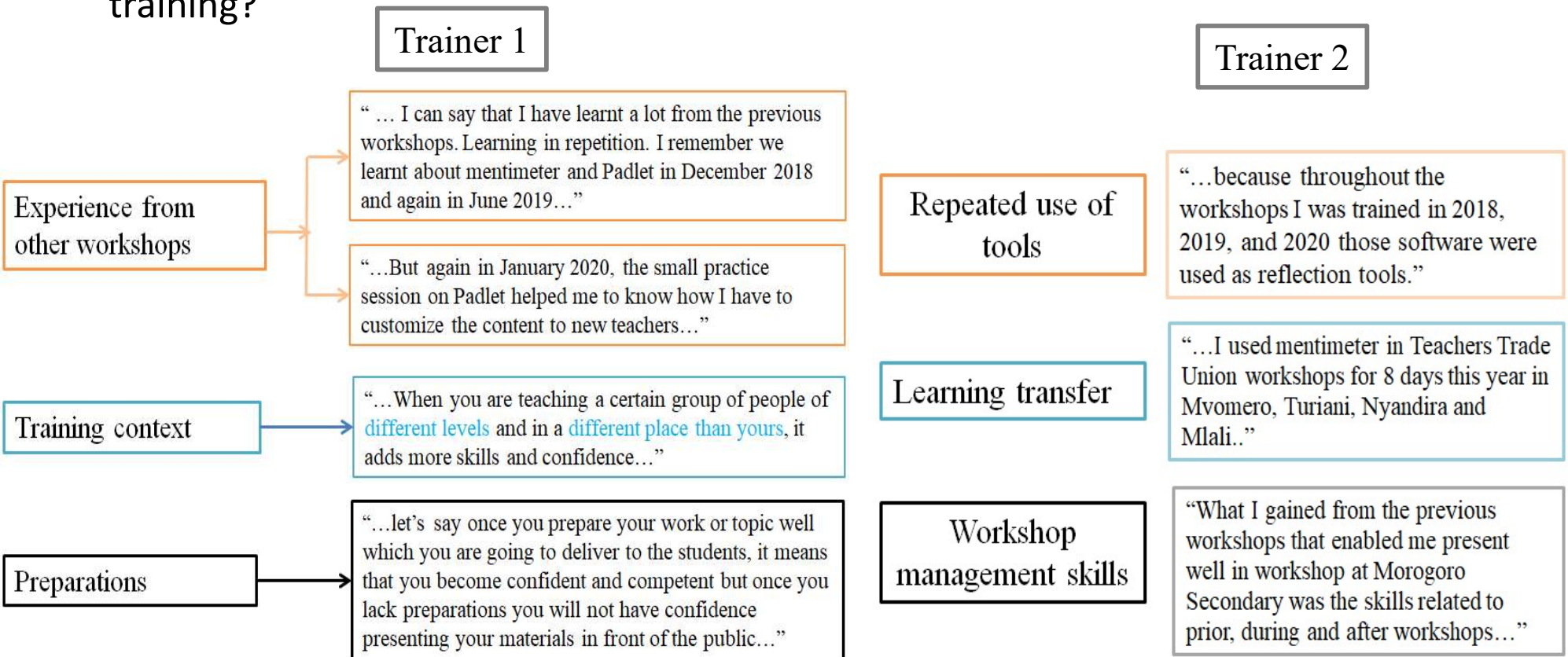


Trainer 2

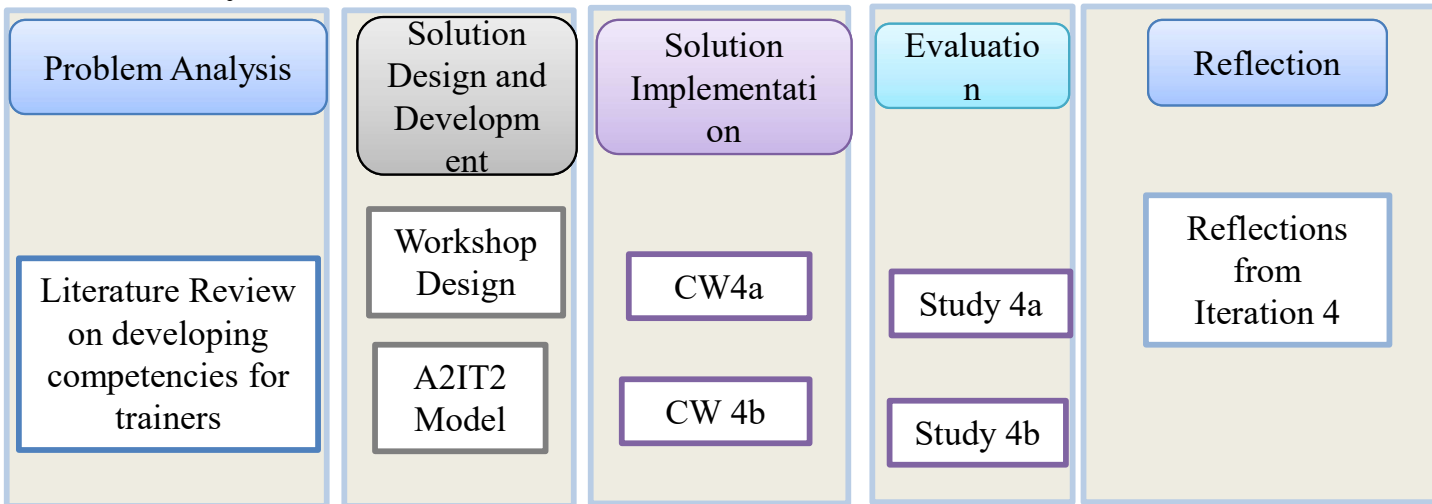


Feature	Meaning
Content knowledge	Knowledge of the workshop content
Reflective	Reflect and change methods
Confidence	Demonstrate confidence in front of the audience
Knowledge of audience	Understand contexts of the workshop participants

RQ4.4: What are the reflections of the developed trainer from the solo teacher training?



DBIR Cycle 2 - Iteration 4



From data analysis

- Learning in completeness and in repetition
- The skills and competencies developed
- Different audience, different context

This means:

- Enhanced CK
- Improved confidence

Confirmatory Workshop (CfW)

A2IT2 Model based workshop

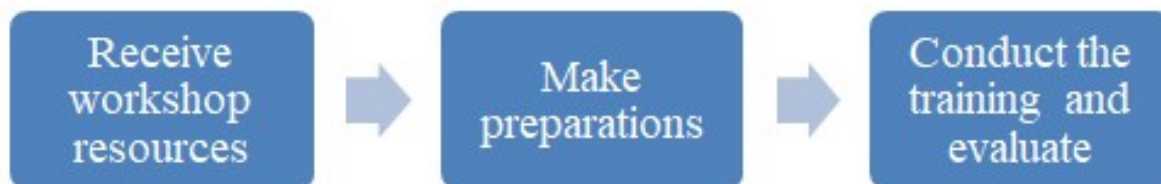
Goal: To evaluate a typical cascaded A2IT2-based workshop using a participant from one of the content workshops – CW4a

Confirmatory Workshop

Selection criteria

1. She had never trained fellow school teachers before.
2. She was aged between 31-40 years, holding a bachelor's degree.
3. She had 6-10 years of teaching experience, teaching Geography and Mathematics.
4. In the past 3 years, she participated in only one 3-days ICT workshop.

Secondary trainer preparations

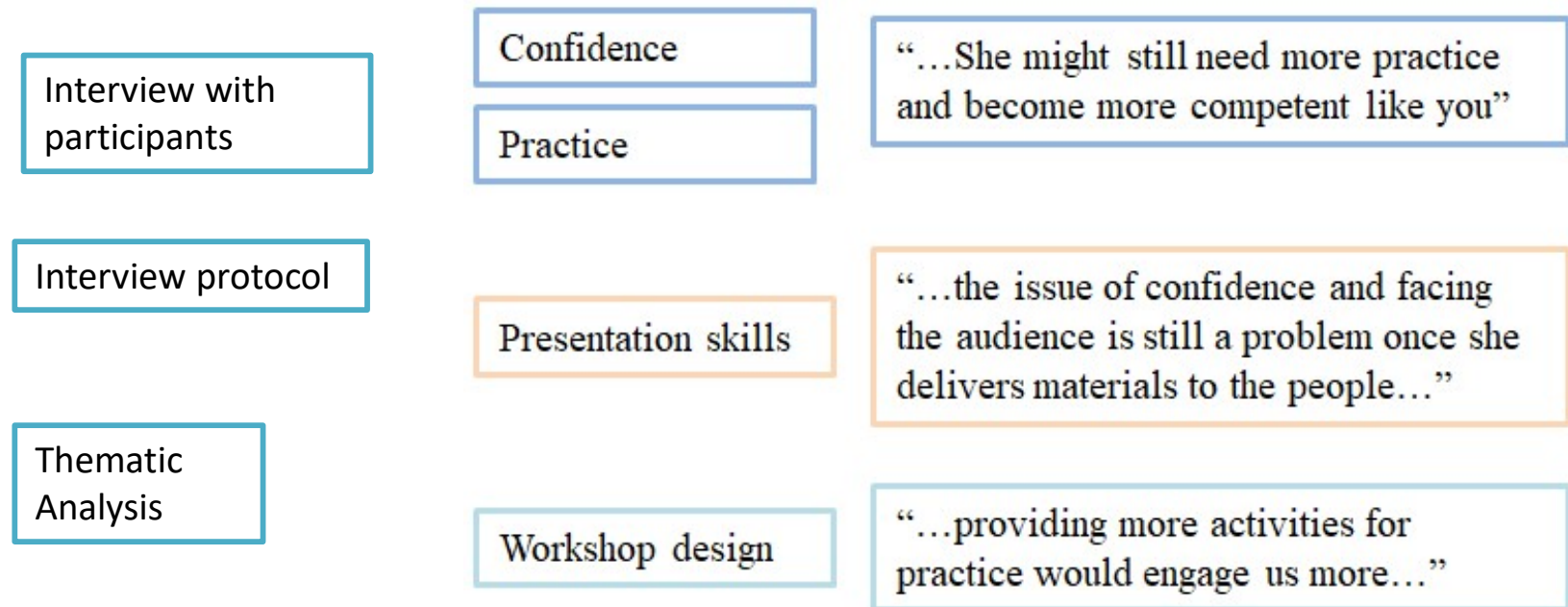


Nov, 2020

- 22 teachers
- 3-days workshop
- Kola Hill Sec School, Morogoro

Confirmatory Workshop

RQ1: How do workshop participants perceive a session taken by a first time teacher trainer?



Confirmatory Workshop

RQ2. What is the perceived confidence to train other teachers on technology tools?

Numeric Rating scale

Confidence in	Threshold	CfW Study (N=22)	Study 4b (N=22)
Training other teachers on mentimeter	$\geq 70\%$	12(59.0%)	16(72.0%)
	$< 70\%$	10(41.0%)	6(28.0%)
Training other teachers on Padlet	$\geq 70\%$	15(68.1%)	15(68.1%)
	$< 70\%$	7(31.9%)	7(31.9%)
Using PowerPoint in teaching and learning	$\geq 70\%$	17(81.0%)	20(90.0%)
	$< 70\%$	4(19.0%)	2(10.0%)

Confirmatory Workshop

RQ3: What are the difficulties to train other teachers on technology integration in teaching and learning?

Responses of participants with confidence <70% on tech use

Thematic Analysis

Tough to follow

“Because I have other simple option to use than Padlet, like Mentimeter”

Less Content Knowledge

“Currently I have no enough knowledge on mentimeter”

Less Practice

“I believe I need to do more practice so as to improve more”

Less Confidence

“I am not competent enough about the topic on Padlet”

Confirmatory Workshop

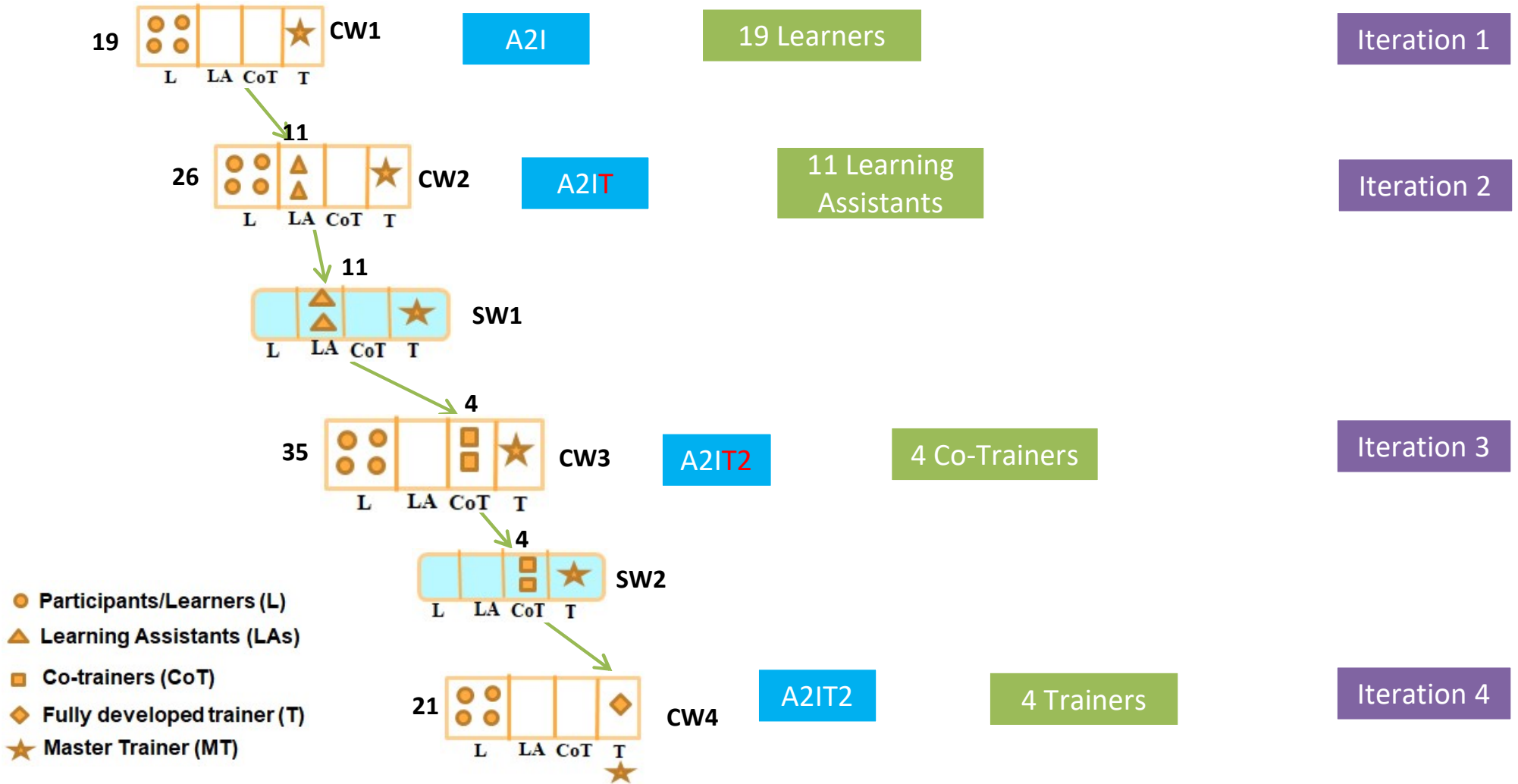
Reflection 1:

- Feedback from participants: less confidence, presentation
- Training orchestration: Activities and engagement

Reflection 2: Assessing the technology in lesson plans

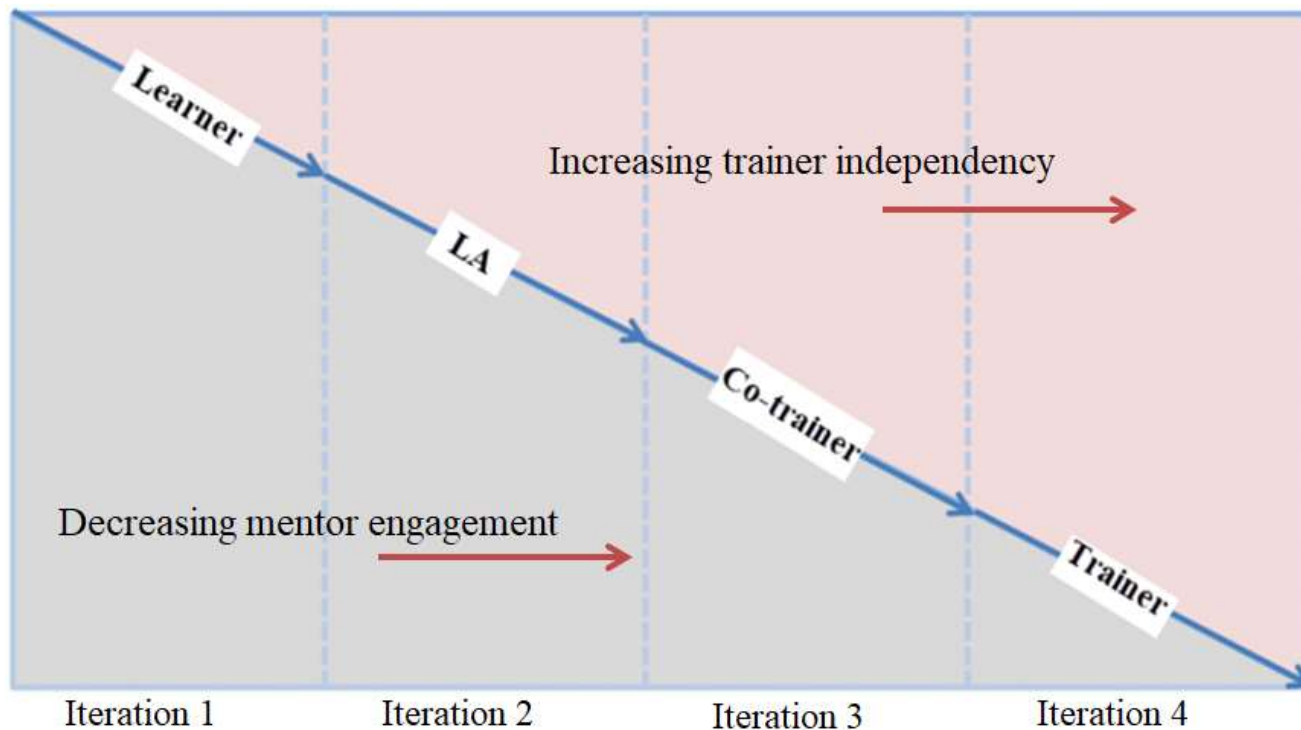
Study 4b (developed trainer)	CfW Study (undeveloped trainer)
Instances of technology added in LP	Instances of technology not added in LP
<ul style="list-style-type: none"> • 2 or more instances of technology in group presentations • Worked well 	<ul style="list-style-type: none"> • Instances demonstrated during group presentations. • Two groups demonstrate challenges on QR code links to technology tools

A2IT2 Model Summary



Teacher trainer development

Gradual release of responsibilities [1]



1. Pearson, P. D., & Gallagher, M. C. (1983). The instruction of reading comprehension. *Contemporary educational psychology*, 8(3), 317-344.

A2IT2 Solutions to the Cascade Implementation Challenges

Cascade Implementation Challenges	Solution by A2IT2
Training Design-related	
Focus on content knowledge (Karalis, 2016)	Specific skills were embedded in the training programme
Dependency on Top-Down approach (McDevitt, 1998)	Needs analysis is conducted to determine requirements from participants
Less feedback from top to bottom (Dichaba, 2013; Mathekga, 2006)	Continuous mentor support is available throughout the workshops
Trainer-related	
Insufficient knowledge about workshop content (Hooker, 2008)	The secondary trainers learnt the same content in 4 different workshops (in repetition)
Content distortion and dilution (Dichaba & Mokhele, 2012)	The secondary trainers are trained on the same content in repetition to master the content
Content misinterpretation (Engelbrecht et al., 2007; Jansen, 2003; Suzuki, 2011)	The secondary trainers learnt the same content in 4 different workshops (in repetition)
Lack of confidence (Bax, 2002; Engelbrecht et al., 2007)	Shift in expertise from learner to learning assistant to co-trainer and finally trainer during the workshop

Thesis Claims

1. A2IT2 model **enhances content knowledge** which increases confidence and reduces distortion, misinterpretation and dilution of the training content.
2. The developed teacher trainer **plans, conducts and evaluates** a teacher training programme effectively.

Evidence for the Claims

1. Increased trainer's self-efficacy to conduct training programmes successfully
 - Ease of the trainer to use tech tools on daily basis (Study 4b)
 - Important components of the workshop: Plan, conduct & Evaluate (Studies 4a & 4b)
2. Perceived confidence in technology tools
 - Confidence to use technology tools in T and L (Studies 4a & 4b)
 - Confidence to train other teachers on the technology tools
3. Technology Integration in lesson plans (Studies 3 &4)
 - Visible in lesson plans and during presentations
 - All instances worked well for all the two trainers

Implications Implications

1. **Teachers:** Teachers who look forward to becoming teacher trainers need specific skills to manage the adult participants in workshops.
2. **TPD programme designers:** few teachers can be developed to become quality trainers
3. **Teacher trainers** (TPD programme implementers): Go beyond CK, incorporate some skills
4. **Local facilitators:** A2IT2 model can be useful in developing trainers at local levels

Generalizations

A2IT2 model: ICT domain, teachers, Tanzania!

1. Training teachers in countries with **similar TPD conditions** (few CPD opportunities, low tech)
2. Training participants in **other domain** specific content areas, e.g. Science, Maths (refer Appendix L)
3. In other disciplines (e.g. corporate business) which want to deploy **local people** as trainers

Limitations

1. *Sample size: Few participants per workshop*
 - 20-35 per workshop
2. *Male teacher trainers:*
 - Like in many preferences, males dominate
3. *Lack of reliable TPD reports in Tanzania:*
 - Number of TPD sessions conducted
 - Lack of reports/publications about the same

Thesis Contribution

1. Scientific

- A2IT2 model

2. Practical

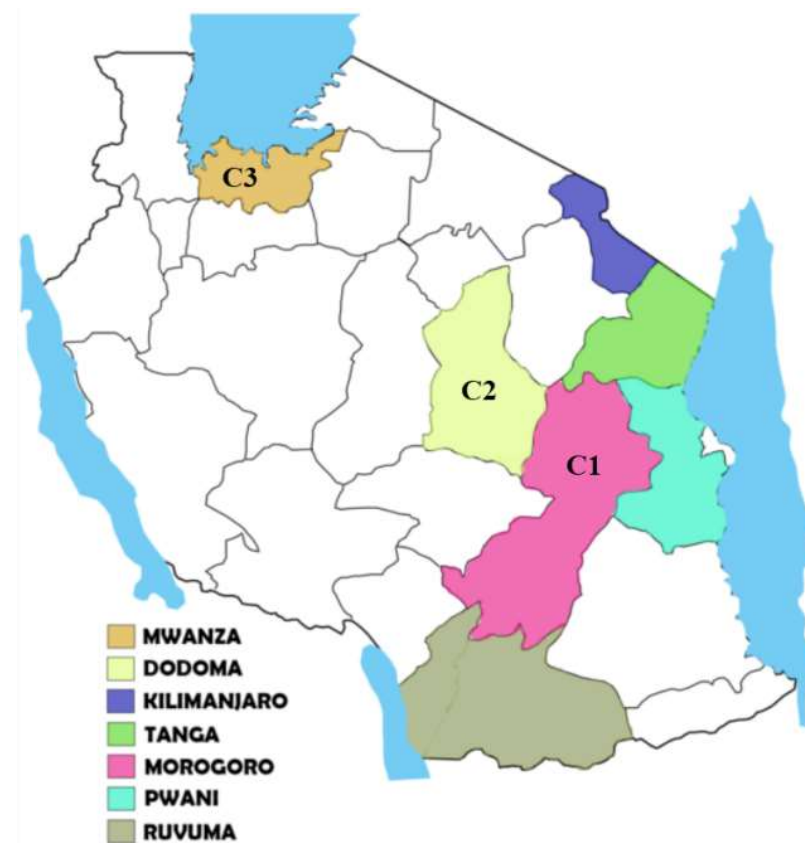
- *Cascading Effect in Schools after the Workshop: Teachers transferred into their contexts*

3. Societal

- 143 teachers trained on content

4. Researcher

- *Researcher as a Designer, Trainer and Mentor*
- *Improved Training competencies*



Recommendations

1. When planning for Teacher Training Programmes
 - *Selection of training participants:*
 - *Training Design:* Include sessions on basics of ICT
 - *Design for Transfer:* Mentor role; training plan
2. Preparation of the Training Session
 - *Developing Teacher Trainers:* Select the right teachers for development
 - Bring Your Own Device (BYOD)
 - *Blended Workshops for TPD*
3. Assessment and follow-up
 - *Ensure assessment and Feedback in cascade*
 - *Deploy technology tools to follow up: Whatsapp, Google Meet*

Future Research Directions

1. *Combining the LA functions into the CoT stage*
2. *Design to Develop Gender-balanced Teacher Trainers*
3. *Determine the Impact of Application of A2IT2 model in Training teachers*
4. *Education management as a catalyst to technology integration*

Publications

- ❖ Ngeze, L. V., Khwaja, U., & Iyer, S. (2018). Cascade model of teacher professional development: Qualitative study of the desirable characteristics of secondary trainers and role of primary trainers. In *Proceeding at the 26th International Conference on Computers in Education* (pp. 755-760).
- ❖ Ngeze, L. V. & Iyer, S. (2019). Developing a Model for Effective Cascaded School Teacher Training on ICT Integration in Tanzania. 27th International Conference on Computers in Education Conference I, 801-805
- ❖ Ngeze, L. V. & Iyer, S. (2021). From Teaching to Teacher Training: Embedding Important Skills Needed to Develop a Teacher Trainer in Cascaded Teacher Professional Development Programmes. Proceedings of the 29th International Conference on Computers in Education. Asia-Pacific Society for Computers in Education

Acknowledgement

- ❖ God: For the strength, energy and healthy to continue
- ❖ My Guide: Prof. Sridhar Iyer for the guidance and support
- ❖ My RPC: Prof. Sahana Murthy and Prof. Chandan Dasgupta
- ❖ External Examiners: for the comments to improve my thesis
- ❖ Faculty members: Contributions during APS and discussions
- ❖ TUET Team: Dr. Jayakrishnan M and Dr. Gargi Banerjee
- ❖ ET Research Scholars: Lab discussions, comments and feedback
- ❖ My batch mates: The different support in every aspect of the work
- ❖ ET Dept. Staff: for the varied support at different times
- ❖ Dr. Elia Y.K. Kibga for the inspiration and guidance into the field
- ❖ My family: Wife and our kids for the support and motivation
- ❖ To everyone who supported me in many different ways.

THANK YOU!

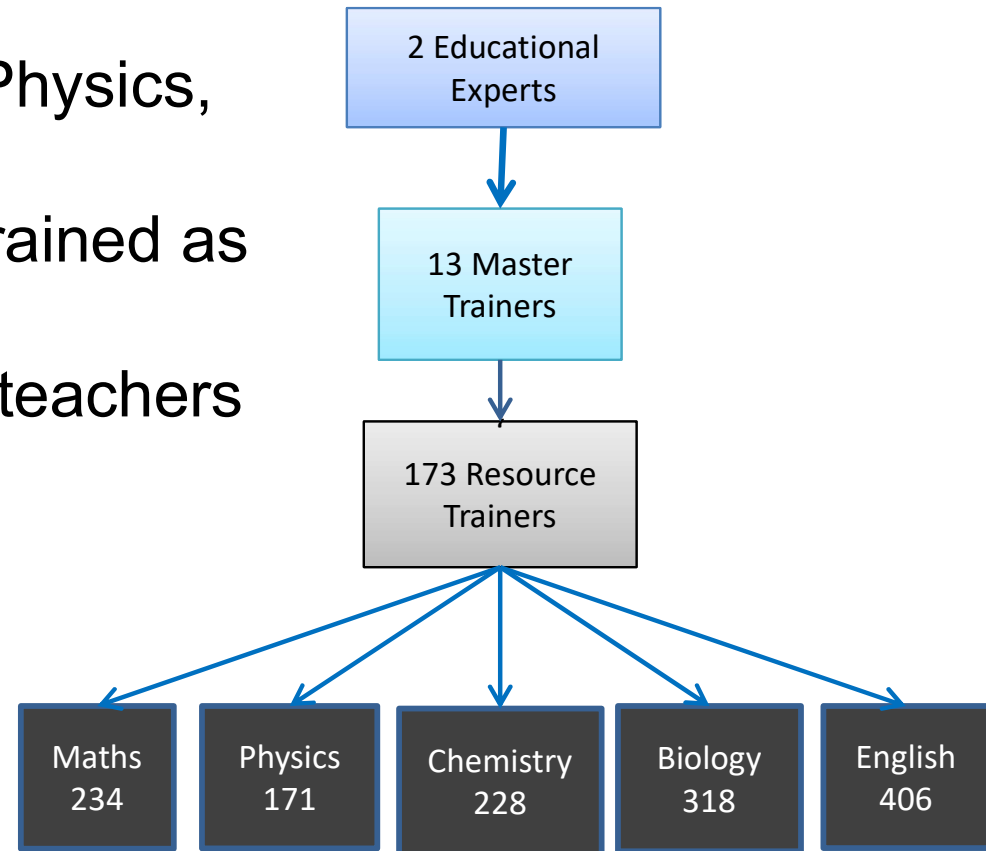
A2IT2 Model in a Cascaded TPD Programme

A2IT2 Model in a Cascaded TPD Programme

- ✓ Project Name: Enhancing the Quality of Secondary School Education through a holistic approach in Zanzibar (EQSSE-Z)
- ✓ Goal:
 - Implementation of competence-based curriculum (CBC) in teaching MSE subjects; and
 - Integration of ICT in teaching and learning of the MSE subjects.
- ✓ Duration: 4 years (Jan 2021 – Dec 2024)
- ✓ Funded by: KOICA (Korea International Development Agency)
- ✓ Implementer: Good Neighbors
- ✓ Target: Training 1357 Maths, Science and English (MSE) teachers in Zanzibar
- ✓ Call for Consultants: Applied as a co-consultant

A2IT2 Model in a Cascaded TPD Programme

- ✓ 5 Cohorts of teachers: Maths, Physics, Chemistry, Biology and English
- ✓ Teachers were selected to be trained as Resource Trainers (RTs)
- ✓ RTs had to train all 1,357 MSE teachers



A2IT2 Model in a Cascaded TPD Programme

- ✓ RTs were trained for 6 days (as **Learners**)



- **Microteaching Sessions** on Thursday and Friday
- **Skills Sessions** on Saturday (the last Day)
- After the training, RTs were categorized as Qualified and Unqualified
- The qualified RTs were piloted to train teachers

A2IT2 Model in a Cascaded TPD Programme

Pilot Training by RT(**Co-Trainers**)

- ✓ Before the actual teacher training, a pilot training was conducted.
- ✓ 5% of the total expected English teachers were taken as a sample of teachers
- ✓ The qualified RTs trained **about 80%** of the content
- ✓ The MT guided and covered **about 20%** of the content

A2IT2 Model in a Cascaded TPD Programme

RTs take on full training session at the centre (**Trainer**)

