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JICA 課題別研修
「初等算数カリキュラム開発」
2020 年度
報告書



ポスト COVID における研修の在り方の検討

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略語

略語	英語	日本語
AITSL	Australian Institute for Teaching and School Leadership	オーストラリア・ティーチング・スクールリーダーシップ機構
CCK	Common Contents Knowledge	一般的内容知識
HCK	Horizon Content Knowledge	水平的内容知識
ICT	Information and Communication Technology	情報通信技術
JICA	Japan International Cooperation Agency	国際協力機構
KCC	Knowledge of Content Curriculum	内容とカリキュラムの知識
KCS	Knowledge of Content and Student	内容と生徒の知識
KCT	Knowledge of Content and Teaching	内容と教授の知識
MIE	Malawi Institute of Education	マラウイ教育機関
MKT	Mathematical Knowledge for Teaching	教えるための数学的知識
ML	Mailing List	メーリングリスト
PCK	Pedagogical Content Knowledge	教授的内容知識
PISA	Programme for International Student Assessment	国際学習到達度調査
PPCA	Problem, Plan, Data, Analysis, Conclusion	問題、計画、データ、分析、結論
SCK	Specialized content knowledge	専門的内容知識
SEAMEO-RECSAM	Southeast Asian Ministers of Education Organisation - Regional Centre for Education in Science and Mathematics	東南アジア教育大臣機構 理数科教育センター
SMASE-WECSA	Strengthening of Mathematics and Science Education in Western, Eastern, Central and Southern Africa	アフリカ理数科教育域内 連携
SMK	Subject Matter Knowledge	教科内容知識
SNS	Social Networking Service	ソーシャルネットワーク サービス
TIMSS	Trends in International Mathematics and Science Study	国際数学・理科教育動向 調査
UNESCO	United Nations Education, Scientific and Cultural Organization	国際連合教育科学文化機 構（ユネスコ）

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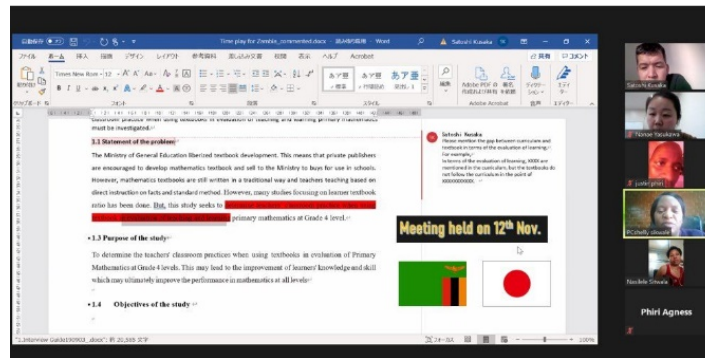
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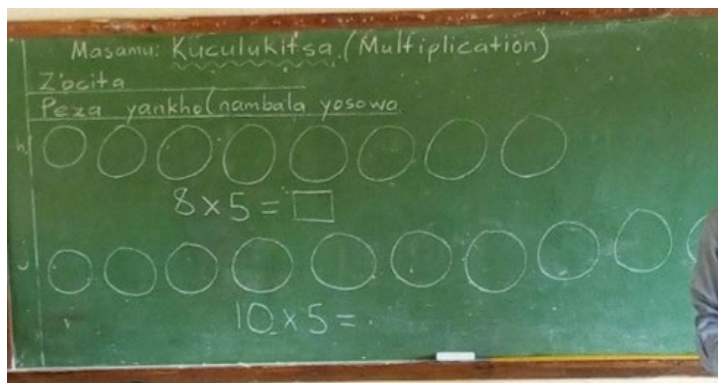
活動の写真



第一回ワークショップ



フォローアップミーティング



フィールド調査

本報告書は、2020 年度に実施した「算数カリキュラム開発」研修について報告するとともに、それを事例にオンラインでの研修の在り方や新しい研修可能性について考察することを目的とする

第 1 章 研修の概要

1.1 研修の基礎情報

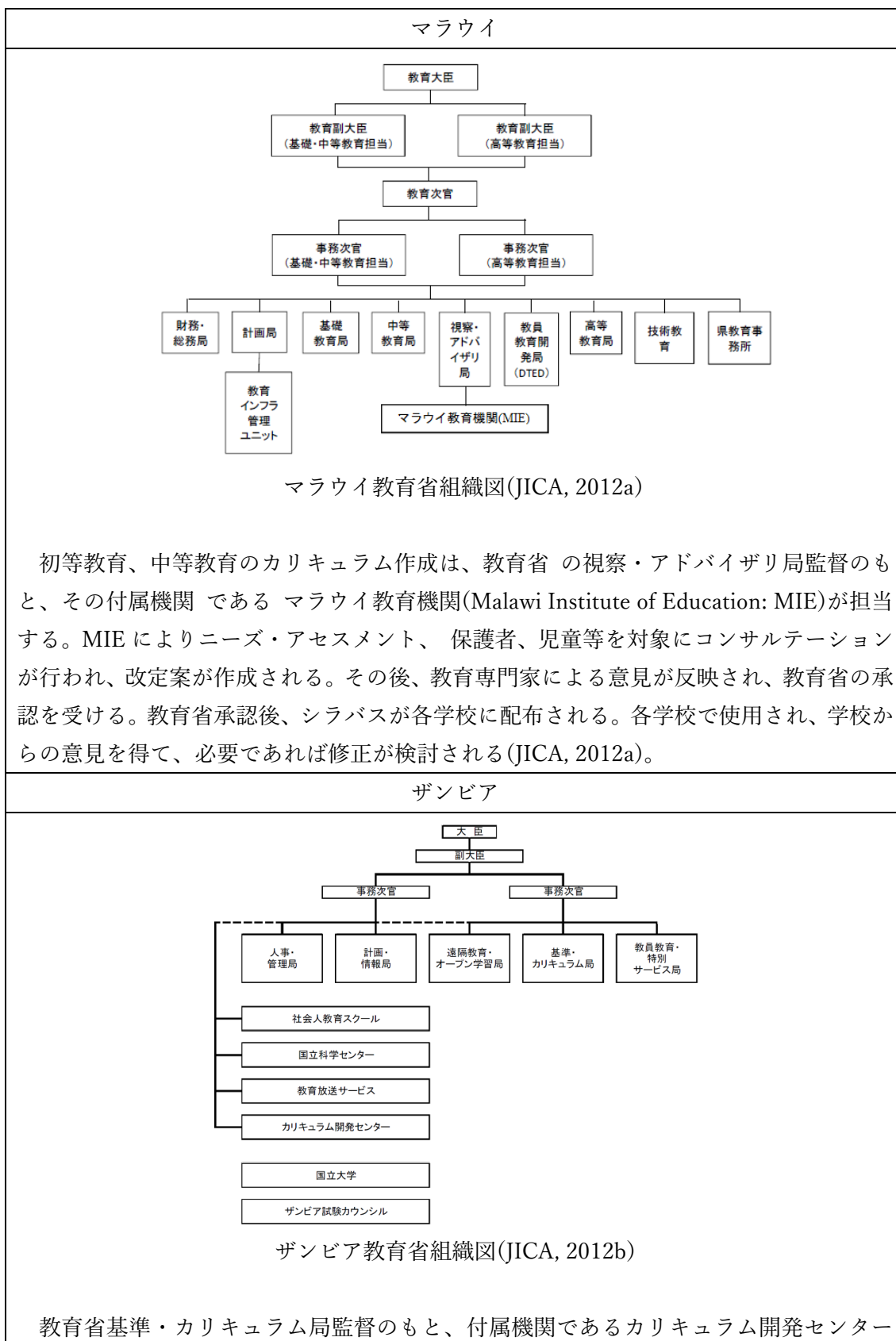
本研修は「初等算数カリキュラム開発」というタイトルで行われた。研修期間は 2020 年 10 月 29 日から 2021 年 2 月 18 日までで、研修活動の概要は表 1 のとおりである。

表 1. 研修の概要

2020 年 10 月 29 日	第一回ワークショップ
フォローアップ [ワークショップ間の活動]	・ 予備調査の計画、調査の実施、結果の分析 ・ 週報の提出、提出
2020 年 12 月 10 日	第二回ワークショップ
フォローアップ [ワークショップ間の活動]	・ 本調査の計画、実施、結果分析 ・ 週報の記入、提出
2021 年 2 月 18 日	第三回ワークショップ
研修終了後	本研修で取得したエビデンスを基に、カリキュラム改定への提言をまとめる

研修は、アフリカ英語圏に対して行われ、対象国は 3 か国（エチオピア、マラウイ、ザンビア）であった。エチオピアは急遽カリキュラム改定が行われることが決まったため、第二回ワークショップからは不参加となり、最終的にはザンビア国およびマラウイ国のみの参加となった。研修員は各 2 名と 4 名で、計 6 名は最後まで参加した(参加者の詳細は添付資料 1 を参照)。ザンビア国およびマラウイ国のカリキュラム開発制度の概要を表 2 にまとめる。

表2. マラウイおよびザンビアのカリキュラム開発制度



(CDC) がカリキュラム改定を担当する。国家レベルのシンポジウムから始まり、続いて技術委員会専門委員による協議が重ねられ、シラバスの改定案が作成される。同改定案は、関係者を集めたシンポジウムでさらに協議される。最終的に科目別のカリキュラム委員会によって検討され承認を受ける (UNESCO、2010)。

1.2 研修の背景および目的

初等算数カリキュラム開発に焦点を当てた JICA 課題別研修は、2019 年に続き今回で 2 回目である。その背景には、開発途上国においても近年教育の質の向上が叫ばれる中で、その実施にはカリキュラム開発能力を高めることが必要だからである。この開発能力をつかむには、用語の的確な把握が重要である。

まず「カリキュラム」という言葉は多岐にわたっており、その定義だけで多くの議論を行うことができる。ここでは一つ一つを取り上げて精緻に議論することを目指すのではなく、大きく三つのレベルを分け、その関係性を全体的にとらえることを重視している。

図 1 は国際理数科教育調査 (TIMSS) で用いられるものである。教育の質の中核をなすと考えられる三つのカリキュラム—意図されたカリキュラム、実施されたカリキュラム、達成されたカリキュラム—は、国¹—学校・教師—子どもあるいは学習指導要領—教授活動—学習活動などともとらえることができる。いずれにせよ、それぞれを把握するとともに関係性としてとらえることが重要である。このように考えたときに、関係性についていくつかの重要なことが指摘できる。

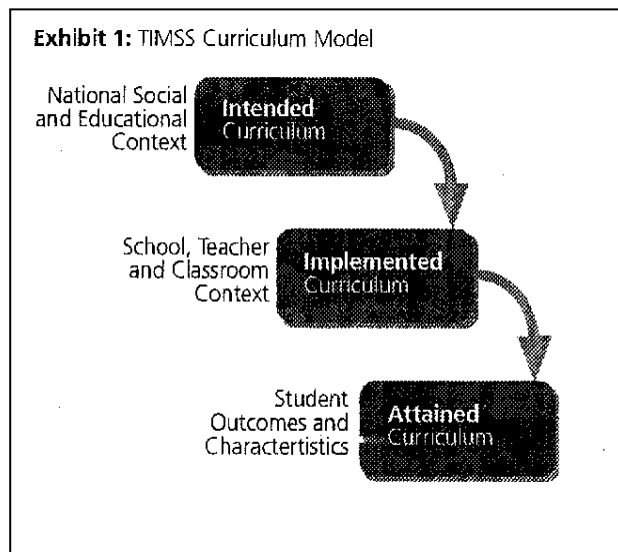


図 1. 三層のカリキュラム

- ・ 起点は意図されたカリキュラム (Intended curriculum) である。
- ・ 三つのカリキュラムは矢印で結ばれており、それらは関係している。
- ・ 終点は達成されたカリキュラム (Attained curriculum) である。

そのような確認をへて、始点である意図されたカリキュラム、つまり国としての教育に関する考えや、その具体化である学習指導要領はすべての始まりととらえることができる。

¹ 国によっては、カリキュラムが国レベルで規定されていない場合もある。

次にカリキュラム「開発」について、検討したい。開発は新しく生み出すことも意味するが、当然各国ではすでに教育活動を行っているという意味で、カリキュラムはすでに存在している。したがって、ここでの開発は多くの場合現行のものを改善あるいは改定する（以下、カリキュラム開発）ということを示す。したがって、カリキュラム開発は、意図されたカリキュラムを改定するのみではなく、三つのカリキュラムの関係性を新しく生み出すことも示している。

図2にもあるようにこのカリキュラム開発は、問題の同定から始まる。問題のない完璧な教育というのは存在しないという理解に立てば、この改善は永久に続く過程である。したがって現行のカリキュラムの問題を同定することはカリキュラム開発の最初の一步である。つまり意図されたカリキュラムはカリキュラムの始点であり、さらにカリキュラム開発における問題同定は、まさに最初の一步に当たる。

以上より初等算数カリキュラム開発は、初等レベルでの数学教育において、問題同定から始まるプロセスによって、教育の根幹を三つのカリキュラムの各々およびそれらの関係性ととらえて、それらを改善することを指している。

ここで問題同定にある「問題」について考察したい。三つのレベルのカリキュラムの各々にある場合と、その関係性にある場合と、さらにそれらの背景にある場合がある。

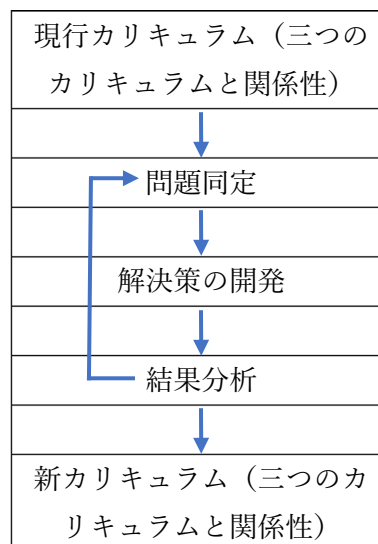


図2. カリキュラム開発過程

表3. カリキュラムに関する問題のタイプと具体例

問題タイプ	例
(1) 三つのカリキュラムの各々における問題	意図されたカリキュラムが、過重な内容になっている、十分に数学的な深さを実現していない、知識にのみ重点があるなど
(2) 三つのカリキュラム間の関係性における問題	意図されたカリキュラムの内容を実施されたカリキュラムでカバーできていない、意図されたカリキュラムで目指す目的を達成されてカリキュラムにおいて子どもたちが十分に達成できていないなど
(3) 三つのカリキュラムの背景に関する問題	意図されたカリキュラムがその背景にある産業界の要請に沿っていない、実施されたカリキュラムの背景にある教師教育の質が十分でないなど

以上を踏まえて、2019年度の研修目的を次のように設定した。なおこの時の参加国は、マラウイ、ザンビア、エチオピア、ルワンダ、南スーダンであった。

【2019年度研修目的】

三つの視座（社会、子ども、教科内容）に基づき、カリキュラム開発過程を理解、改善した数学カリキュラム案を策定することを通して、数学カリキュラム開発能力を育成することを目的とする

2019年の研修の特徴を表4にまとめる。2019年の研修は、この目的に対応すべく企画した研修である。具体的には、日本の算数・数学カリキュラムの構造及び改定過程について講義形式で学んだ後、小中学校を訪問し算数・数学の授業を観察することにより、意図されたカリキュラムと実施されたカリキュラムの関係について考察を深めた。さらに、日本および参加国の算数・数学カリキュラムを比較し、類似点および相違点について議論し、最終的に自国の数学カリキュラムの改定案を作成した。すべての活動において、三つの視座（社会、子ども、教科内容）を基に議論を進めた。

表4. 2019年度の研修の特徴

成果	活動	方法
数学カリキュラムを分析する	事前課題のプレゼンテーション	発表
	構造に注目した数学カリキュラム分析	ワークショップ
数学カリキュラム開発を理解する	日本の数学カリキュラムおよびその背景の分析	講義、ワークショップ
	カリキュラム開発における三つの視座の理解	講義、フィールド調査
	シラバス、カリキュラム・ガイドラインの改善プロセスの理解	講義
数学カリキュラム案を策定する	数学カリキュラム案を作成する	ワークショップ
	国ごとに提案書を作成(提案は改定過程を明らかにし、参加者の活動計画を示す。)	発表

このような研修を行った結果として、研修後に行った評価を表5にまとめる。

表5. 2019年度の研修の評価

成果	実施者の評価	研修員の評価
自国の算数カリキュラムを分析する	講義で日本の制度を理解するとともに、カリキュラム分析作業を通して、日本や他国のカリキュラ	自国のカリキュラムを他国のものと比較することにより、自国のカリキュラムの特徴、強み、弱

	ムを理解することで、他国と自国を比較した発言が多くなり、理解が深まった。	みを認識することができた。
数学カリキュラム開発を理解する	カリキュラム開発の際に考慮すべき3つの観点（社会・子ども・学問）を盛り込んだ、カリキュラム開発過程に関する提案書を作成した。	<ul style="list-style-type: none"> - 日本の算数カリキュラムがどのように改善されるのかを深く理解することができた。 - 学習内容のスパイラルな編成の重要性を学ぶことができた - 優れたカリキュラムは社会、子ども、学問の視点が考慮にされていることについて理解した。
数学カリキュラム案を策定する	当初、国を混ぜて2グループでドラフト案作成作業を行う想定であったが、各国のカリキュラムや教育事情が大きく異なることから、各国に分かれての作業とした。各国での作業を進めつつ、各々の案を発表し意見交換の場を設けることで、議論が活発になり、より具体化した発言が多く見られるようになった。	<ul style="list-style-type: none"> - 本研修で策定した案を教育省の職員とすべての主要なステークホルダーに周知する必要がある。 - 本研修で策定した案を実際に実現できるかどうかは、予算の問題が強く影響する。

出典：2019年初等算数カリキュラム開発研修業務完了報告書から抜粋

この評価からわかることは、研修について意図したことが達成され、参加者の満足度が非常に高いこと、他方で帰国後の活動計画が当該国から離れているためどうしても抽象的になってしまうことである。事実、昨年度作成したアクションプランを実行できた国はなかった。つまりこのことから、研修は一面成果を上げているといえるが、その本質まで立ち返ってみると、十分に各国のカリキュラム開発に活用できているとは言えない状況であった。

一般的に研修で学習した内容の活用については、これまで様々な研究が行われている。例えば Huges&Grant (2007)は、研修を受けた従業員の半数が、研修で学んだ内容を職場で実践しようと研修直後には考えているが、半年後には12%、1年後には9%にまで減ることを報告している。本研修においても同様に、2019年度に参加し、本研修にも参加した3名の研修員から、「研修で得た知識を同僚へ共有する時間がなかった。」や「予算不足により、計画が実践できないため、研修知識応用の難しさがある。」という意見が事前調査で明らかになった。改善すべき課題が、今回の研修を計画するにあたって検討された。

【カリキュラム開発能力育成の阻害要因】

カリキュラム開発に関する先行研究を概観し、カリキュラム開発能力育成の阻害要因について考察する。Cai & Howson(2013)はカリキュラム開発に影響を与える要因の1つに国際化をあげており、TIMSS や PISA の実際のテスト結果は、教育者にとって重要な意味があるとする一方で、TIMSS のデータを数学教育の改善に利用しようとする国は、個々の項目への回答やそれらの項目の妥当性と重要性、また、生徒の成功や失敗をどのように結びつけるかを慎重に検討する必要があることを指摘した。つまりテスト結果を単純に利用すべきではなく、多角的に検討することの必要性を主張している。また、組織にも阻害要因があると考えられる。魚谷(2012)は「どれだけ優れた計画でも予算が下りない、トップダウンの意思決定過程で下級職員の企画は通りにくいというのは途上国ではよく見られるケースである。」と述べ、開発途上国の計画は概してトップダウン的に起こり、計画立案や実行の困難性をあげている。馬場(2010)は、カリキュラム策定と授業の両方の基盤となる専門性の課題をあげており、「開発途上国における教科教育の脆弱性は、専門性の低さである。それを高めていくためには先進国から知識を輸入することにとどまらず、自らの教育実践を理論化することが求められる。」と述べている。さらに、Kusaka, Nhêze, & Baba(2020)は、教科の専門家集団が専門性を身につけ、専門的知見から数学教育を議論しカリキュラム改定を進めていくことが重要であると指摘する。このように開発途上国でのカリキュラム開発能力育成には様々な阻害要因が考えられ、それらは以下の3点に要約される。

【社会的要因】(例) 試験結果のみに注目している。

【政治的要因】(例) 確実な準備をせずに、カリキュラム開発を行う。

【専門的要因】(例) 当該国に学校カリキュラムを専門とする専門家は少ない。カリキュラム改定についてのエビデンスはない。

研修の中でこれらすべてに対応することはできない。むしろ中核となる専門的要因に集中することで、長期的に見ると社会的、政治的な要因に影響を与えることができるであろう。そこで専門的要因の中で、特にカリキュラム開発にかかわる専門的知識やエビデンスに焦点をあてることとした。

以上より、2019年度の研修では、自国の数学カリキュラムを分析し、課題を同定して、数学カリキュラム改定案を策定する活動を通して、数学カリキュラム開発能力を深めた。他方で、各研修員が策定したカリキュラム改定案はエビデンスに基づくわけではなく抽象的で、研修員が帰国後実際に活用できた割合は

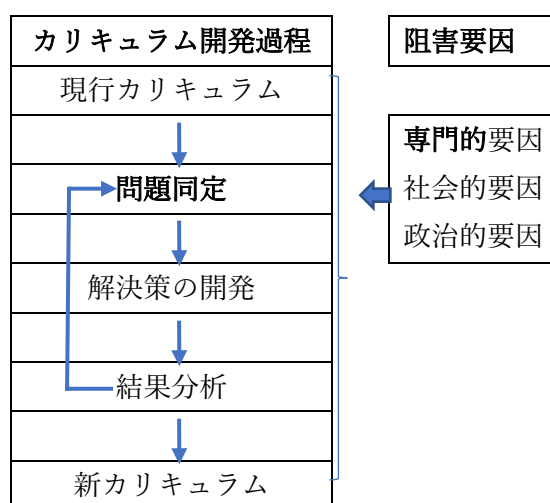


図3. カリキュラム開発過程及び阻害要因

低いことが課題として残った。これは本研修に限ったことではなく各国の文脈からいったん離れる本邦研修全般に言えることである。この課題を解決すべく、さらに、各国にいることを最大限生かすことを考慮し、本研修を企画した。

前提となること

・カリキュラム開発過程に能力が介在している。つまり過程を改善することが、カリキュラムそのものを改善することであり、その能力を改善することと考えている。その過程の最初に位置するのが問題同定である。

・阻害要因には順位がある。特に専門的要因あるいは専門性が最初に来る。例えば、現在のコロナ禍の状況において感染症などの専門家の役割は顕著である。カリキュラム開発においても最も重要なのは、事象・問題を分析し、説明することにある。

これらをもとに、カリキュラム開発過程の最初に位置する「問題同定」、特に「データを用いて状況を分析、説明すること」を本研修の目的とした。

【2020 年度研修目的】

三つの視座（社会、子ども、教科内容）に基づき、改善した数学カリキュラム案について調査、省察を通して、数学カリキュラム開発能力を育成することを目的とする。特に、

- (1) データに基づいたカリキュラム開発(仮説を立て、データ収集・検証を行う)
- (2) 国内と国家間の専門家集団の形成(Baba, Nakai 2011)

第2章 実施計画

本章では、研修を効果的に実施するために、カリキュラム開発能力を内包した総合的な能力の評価ルーブリック及び、開発能力を明示したり、捉え直したりする ICT の活用方法を開発した。上記の二つの要素は、カリキュラム開発過程および研修の目的に関連して設定した本研修の三つの焦点「エビデンス・ベースト、プロセスの可視化、コミュニティの創出」と関係している。2.1 では、本研修におけるカリキュラム開発能力の自己評価ツールとして開発されたルーブリックの理論的背景と4つの領域について明らかにする。2.2 では、本研修の目標のために構想された ICT サービスおよびその活用方法について明らかにする。

表6. 研修の特徴と研修ツールの対応

			研修ツール	
			ルーブリック	ICT
			能力形成（自己評価） 実施者評価	
研修の特徴	エビデンス・ベースト	問題同定	○	○
	プロセスの可視化	能力把握	◎	○
	コミュニティの創出	集団形成		◎

○ 該当する ◎ 大いに該当する

2.1 数学教育専門家²としてのカリキュラム開発能力に関する評価ルーブリックの開発

本研修において、研修員がカリキュラム開発能力形成の根拠となるエビデンスに意識的になること、研修実施者が並行して研修員についてのエビデンスを収集し、研修のプロセスを可視化することに取り組んだ。前者は、研修の前提にあるように、カリキュラム開発過程、問題同定についてエビデンスを蓄積することを通して、研修員が数学教育専門家としての専門的な学びを継続的に深めていくことが期待された。このような専門的な学びは、自身の試行錯誤の過程や、その過程で出現した学びについて省察することにより可能となると考えられる（ショーン, 2007）。そのため、本研修では、省察を行うための自己評価ツールとして、数学教育専門家としてのカリキュラム開発能力の評価ルーブリックを先行研究に基づき開発した。以下、本ルーブリックの理論的背景及び4つの領域について、明らかにする。

また後者は、同じデータが研修員のカリキュラム開発能力が改善された度合いを評価す

² 本報告書における数学教育専門家は、数学科の意図されたカリキュラムを開発することを専門とする者と規定する。類似の用語で数学教師および、数学教師教育者が存在するが、数学教師は実施されたカリキュラムを開発・実施することを専門とする者、数学教師教育者は数学教師の職能開発を専門とする者（具体的には、教育事務所の指導主事など）と規定する。

るためのメタレベルでのエビデンス（メタ・エビデンスと呼ぶ）として使い、研修実施者が研修評価（実施者評価）を行うことでもある。

(1) 数学教育専門家の専門性を捉える理論的枠組み

本研修に参加した研修員は、1.1にあるようにカリキュラム開発を担う数学教育専門家である。そこで、教室で子どもに指導を行う教師の専門性や、教員養成校で指導を行う数学教師教育者の専門性と必ずしも同一視することはできない。

例えば、馬場（2014）は、数学教育協力を「数学教育と数学教師教育を内包し、数学教育専門家の〈学び〉のプロセス実現を目的とした外部者による協働的な働きかけ（馬場, 2014, p.22）」と規定し、数学教育協力における三層のプロセス（表4）を示している。数学教育協力の層では、主体を数学教育専門家集団とし、課題意識の形成やカリキュラムの実質化・相対化が取り組むべき課題であると指摘している。本研修は、JICAが開発途上国の数学教育専門家の能力向上を目的として実施するものであるという意味で、この最後の層に属している。

ここに述べた課題に取り組むためには、当該国の数学教育専門家が主体的に課題意識をもち、教室における授業実践を検証することを通して、先進国発のカリキュラムや理論を自国のニーズに沿って再開発するあるいは適応することが求められる。この一連のプロセスにおいて、数学教育専門家は、教師や教師教育者が有する専門性を十分に有している必要があると考えられることから、数学教育専門家の専門性は教師や教師教育者の専門性を内包していると言える。

表7. 数学教育協力における三層のプロセス（馬場, 2014, p.22）

	数学教育	数学教師教育	数学教育協力
目的	数学的考え方の深まり	専門的成長	内発的発展
主体	子ども	教師	専門家集団
支援	教師	教師の教師	外部者
課題	考え方の価値付け・具体化	集団との専門的相互形成	課題意識と実質化・相対化

以上のことから、数学教育専門家の専門性の構成要素を、数学教師および教師教育者の専門性にも共通する専門性である①知識・技能、および数学教育専門家に特有な専門性である②計画・実施のプロセス、③専門家意識、④コミュニティの四つの領域に分類し、規定をした（AITSL, 2011; SEAMEO RECSAM, 2014）。

また、本ルーブリックでは研修員が自己評価して自らの位置と課題を知るために、専門性のレベルを萌芽的段階、基礎的段階、中間的段階、達成的段階、応用的段階、発展的段階の6段階に分類した。専門性が不十分または不確実な萌芽的段階をもっとも初歩的な段階とし、習得的段階を数学教育専門家に必要な専門性が備わっている段階とした。また、応用的段階や発展的段階は、専門性の継続的な深化やさらなる発展が行われる段階であるとした。

ただし、誰が何のために誰を評価するのかについて、注意が必要である。「誰が誰を」に注目すると、自己評価（自分が自分を評価する）、実施者評価（実施者が研修員を評価する）に区別されるだろうし、さらに複雑なのは、自己評価を実施者評価に用いることもできる。その意味で、一つの評価が異なる目的に使われる場合がある。また、達成したと思えるものも、より高いものを目指すときには基礎的段階に位置を変える（格下げする）場合もあるだろう。

そこでここで重要なのは、整理したうえで、評価者が「誰が誰を」、「何の目的で」について自覚的になることである。

(2) ルーブリックの4領域

本ルーブリックを構成する4つの領域の理論的背景は以下の通りである。また、下記の先行研究のレビューを踏まえて、実際のルーブリックの作成では、Australian Professional Standards for Teachers、Southeast Asia Regional Standards for Mathematics Teachers、Philippines Professional Standards for Teachers で用いられた動詞表現を参考にしながら専門的な学びの深化について明記し、ルーブリック（添付資料2）を作成した。

① 知識・技能

Ball et al. (2008) が提唱した「教えるための数学的知識 (Mathematical Knowledge for Teaching: MKT)」を援用した (図1)。具体的には、教科内容に関する知識 (subject matter knowledge)、カリキュラムに関する知識 (knowledge of content and curriculum)、子どもの学習状況と典型的な誤答・原因に関する知識 (knowledge of content and student)、指導法のレパートリーと適切な使用に関する知識 (knowledge of content and teaching) に分類した。教科内容に関する知識では、萌芽段階では一般的内容知識 (common content knowledge) を取り扱うのに対し、専門性の段階が深まるにつれて、専門的内容知識 (specialized content knowledge) や水平的内容知識 (horizon content knowledge) が次第に形成されることを意図した。³

³ Mathematical Knowledge for Teaching (Ball et al., 2008) で提唱されたそれぞれの知識の日本語訳は新井 (2016) に依拠した。



図4. 教えるための数学的知識 (Ball et al., 2008)

② 計画・実施・分析のプロセス

Wild & Pfannkuch (1999)は統計実践家がもちいるプロセスについて調査を行い、それをPPDACサイクルとして定式化した。PPDACサイクルとは、Problem (問題)、Plan (計画)、Data (データ)、Analysis (分析)、Conclusion (結論)を繰り返すことにより、データ分析における課題解決を行うための枠組みである。本研修での研修員がたどる過程は、狭い意味での統計を用いるのではないが、研修員が問題同定、解決策の開発、結果分析のプロセスを実施するという意味で、PPDACサイクルと非常に類似している。そこで本ループリックでは、PPDACサイクルを応用し、それぞれの段階で必要な技能について明記した。

③ 専門家意識 (Professionalism)

Liberman (1956)によって専門職性の判断基準となる指標が示されたことをきっかけに、専門性、公共性・倫理性、自律性が教育の文脈における専門職の特徴であると指摘されてきた(朝日, 2014, p.10)。①知識・技能で規定された専門的知識や技能に対して、本領域(専門家意識)では研究的・実践的努力やその動機、結果に対する責任などを内包する倫理性、そしてそれらを根拠として与えられる自律性について、規定した。

また、複雑かつ不確実で価値観の衝突を内在する今日の社会における数学教育専門家像は、「反省的实践家」である(ショーン, 2007)。反省的实践家の知は(Knowing)は行為についての省察(Reflection-on-action)、行為の中の省察(Reflection-in-action)の中で生成されている。これら省察に関する要素を専門家としての継続的職能開発の観点から規定した。

④ コミュニティ

Lave & Wenger (1991)の実践共同体 (Communities of practice) の概念を援用した。実践共同体とは、同一の関心事や課題、熱意などを共有し、その分野の専門的知識や技能について継続的な相互交流を通して深めていく人々の集団のことである。本ループリックでは、1) 自国における専門家集団及び教育関係者とのつながりに基づく実践共同体、2) 他国の専門家集団及び教育関係者とのつながりに基づく実践共同体という、2つの異なる実践共同体への参加について規定した。

開発途上国の文脈を考える時、①、②、③の知識・技能やプロセス、専門家意識は個別能力だけではなく、集団的にとらえることも必要である。なぜならこれらの多くの国が植民地化の歴史の中で、自立性を失ったり、専門的知識の外部依存性 (馬場, 2014) を形成したりしているからである。その意味で Knowledgeable others (Takahashi, 2013) の考え方もこの延長線上に捉えられると、専門的知識の外部依存性を固定化してしまいかねない。それに対して、ここで述べるコミュニティは、専門性を有した自律的集団としてのそれである。そのことは表7の専門家集団に対応している。

2.2 研修員の活動と ICT サービス

この研修で扱うオンライン⁴の形式について整理しておきたい。4か月間の研修期間中に全3回実施されるワークショップは、研修実施者から研修に対する動機づけとカリキュラム開発のアプローチを講義し、各国が収集したエビデンスを発表する同時双方向型のオンライン研修である。一方、フォローアップ活動は後述する4つに分けられ、非同時双方向型および同時双方向型オンラインでの活動と、非オンラインの活動が組み合わさっている。特に、エビデンス収集は研修員が対面式で実施する。本研修で活用が想定される ICT サービスは表8の通りであるが、そこには非オンラインの活動があることを留意しなければならない。

⁴ 一般的に、オンライン (Online) という用語は「インターネットに接続している状態」を指している。これを通信者間の接続タイミングによって区別すると、Zoomのような同時インターネット接続は On-line、通信者の任意のタイミングでインターネットに接続し情報にアクセスする ML、Dropbox、Facebook は On-demand といえる。当研修は、これらを含むオンライン (Online) 研修である。

表 8. 研修員の活動と ICT サービスの対応

	研修員の活動	ICT サービス	オンラインの形式
全 3 回のワークショップ	(第 3 章にて詳述)	Zoom	同時双方向型
フォローアップ活動	フィールド調査	ML	非同時双方向型
	週報 (活動状況)	ML	
	活動状況の発信	Facebook	
	他国の活動サポート	ML、 Facebook、 Dropbox	

本節ではフォローアップ活動における研修員の活動および各 ICT サービスの活用意図について詳述する。ICT 活用はともすれば技術的な話に終始してしまうが、その背景にある目的と同時に検討されるべきものである。カリキュラム開発能力形成 (自己評価) と実施者評価の両方の目的、つまり研修実施および研修評価に合わせて計画した。これを、本研修の焦点である、エビデンス・ベースド、プロセスの可視化、コミュニティの創出という 3 つの観点から述べる。

(1) フォローアップ活動における研修員の活動

① 調査

カリキュラム開発の第一歩である「問題同定」に対応して、課題を抽出しどのように改定すべきかの根拠となるエビデンスを蓄積する必要がある。カリキュラム開発の一連の活動として、実態を明らかにするために行う調査計画の策定、データ収集ツールの開発、データ収集、データ分析、報告書作成を行う。データ収集ツールの例として、インタビュー項目、アンケート用紙、テストなどが想定される。データ収集は、対面式の現地調査 (非オンライン形式) によって予備調査と本調査の 2 度行い、またアンケートやインタビューの実施では、写真や動画などでも記録を残し、エビデンス・ベースドを意識した活動を促すこととした。

調査計画の策定から報告書作成までの各段階で ML を用いて、日本側と資料を共有し議論することとした。その過程を Dropbox に格納し、参加者の誰もが資料にコメントできる環境を整える。

② 週報

毎週国ごとに週報を作成し、ML によって提出する。メンバーとの打合せ、調査に向けての準備、調査実施、調査結果の分析など、日々の活動および自己評価を記録する。後日振り返った際に、活動の軌跡を確認し、自身の試行錯誤を週報 (エビデンス) によって確かめることが可能となる。

③ 活動状況の発信

各国週に1度程度、Facebookに活動状況を投稿する。打合せの様子や調査において撮影した写真や動画を投稿することにより、参加者にリアルタイムで共有、コメントを受け取ることで、双方の活動を刺激することが期待される。研修員同士のコミュニケーションを促し、コミュニティを具体化する。

④ 他国の活動の意識化と支援

実践共同体として機能するために、ML、Facebook、Dropboxの3つの媒体から、他国の活動状況や作成した資料について知り、質問や意見を発信することで、他国の活動を意識化したり支援したりする。

(2) ICTサービスおよび意図する活用法

国を横断したオンライン研修において、とりわけ非同時双方向型は活動を可視化することが必要不可欠であり、各ICTサービスの活用で意図した事柄を明記する。実施する中で、これらの使用法は、研修員の実態に合わせて調整を行った。

● メールングリスト (ML)

研修の全参加者を1つのグループとしてMLを作成した。主に研修員と研修実施者とのコミュニケーション及び資料の受け渡しとその役割であるが、他のML参加者への間接的な情報共有も意図された。例えば、ザンビア研修員と研修実施者とのやり取りであっても、マラウイ研修員や他の研修実施者にとって有益な情報や活動の助けとなるやりとりもある。よって、個人のメールアドレスではなく、MLを用いたコミュニケーションを基本とした。

● Facebook

ソーシャル・ネットワーキング・サービスの一種である。4か月に渡る研修で研修員が一同に会す同時双方向型のワークショップは、3度である。顔が見えない状況を克服しコミュニティを具現化するため、写真や動画を共有しやすいFacebookを活用する。研修員同士で気軽な意見を交わすことができる場となると同時に、各国の取り組みが投稿されることにより、研修員同士が刺激を受けられるようにする。

● Dropbox

オンラインストレージ・サービスの一種である。研修資料をアーカイブする基盤であり、作成したドキュメントへのコメントを付加する場である。MLによって送られてきた資料を紛失した場合でも、Dropboxを参照することで常に最新および過去の資料を確認することができる。予期せぬ資料の紛失や破損を防ぐため、Dropboxの編集権限を持つのは日本側

のみとした。研修員からの資料送付は ML を基本とし、いつどのような資料が送られたかを ML によって管理する。

● Zoom

Web 会議サービスの一種である。全 3 回のワークショップと、フォローアップでの個別会議で活用する。正確な情報とその情報の背後にある意図や考えなど、テキストのみでは伝達できない事柄を Web 会議によって引き出すことを目的とした。

上記、4 つの ICT サービス (ML、Facebook、Dropbox、Zoom) はいずれもコミュニケーション基盤として有効であり役割が重複しているものの、異なった特性を有している。さらに、初めての試みとなった同時および非同時双方向型のオンライン研修で、どのサービスが各国の研修員によって使いやすいのか、計画段階では判然とせず、試験的に多様なサービスを活用することとした。

(3) 研修目的と ICT サービスとの関係性

(1)(2)において、研修員の活動と各 ICT サービスで意図する活用法を個別に記載した。ここでは、表 6 に示す研修の特徴の観点から ICT サービスの活用意図を示すこととする。

① エビデンス・ベースト

研修員はカリキュラムの課題を抽出し、どのように改定すべきかの根拠となるエビデンスを蓄積する必要がある。Dropbox はエビデンスをアーカイブする基盤となる。また ML、Facebook、Dropbox のコミュニケーションは電子的に記録されるため、それらは研修実施者が研修を評価するエビデンスとなる。

② プロセスの可視化

エビデンスの収集に係る計画、実施、評価に関する一連のプロセスを記録 (週報への記載や調査計画書の改定履歴等) することにより、実施プロセスを可視化する。可視化された記録は Dropbox へアーカイブされるため、研修員はそれら記録を基に自己評価が可能である。

また ML や Facebook、Dropbox によるコミュニケーションの電子記録は、研修実施者が研修員の活動に対する姿勢や考え、またその変容を捉える助けとなる。

③ コミュニティの創出

各 ICT サービスはコミュニケーション基盤を提供する。研修員及び研修実施者に閉ざされたソーシャル・ネットワーキング・グループ (ML、Facebook、Dropbox) に参加することは、一種のコミュニティに参加することである。そこで交わされるやり取りを電子

的に受信し、新たな知識や様々な実践を知る第一歩となる。また、受信するだけでなく自身が発信者となることによって、コミュニティ内で参加の深まり（真正性）を生むことも可能である。Zoom 会議では、同時双方向型のコミュニケーションによって、遠隔地にしながら繋がりを実感し、コミュニティを確かなものとする。

第3章 実施内容

表1に示した研修計画について、実際の実施内容を以下に述べる。

3.1 第一回ワークショップ

10月29日に第一回ワークショップを実施した。同日の研修プログラムを表9に示す。第1回目のため、最初に昨年度の研修の振り返りを行い、本年度の研修の目的である、エビデンスを基にしたカリキュラム開発について説明した。次に、各国が事前に出していた課題「自国の算数カリキュラムの課題」について発表し議論した。さらに、この研修を通して行うべき調査の概要および手法について紹介し、国ごとに取り組む課題について議論した。また、2.1に記載の通り、本研修の目的である数学カリキュラム開発能力について、4つの領域からなるループリックの概要を説明した。最後に、本研修を通して使用するICTツールに関する説明を行った。

表9. 第一回ワークショップ研修プログラム

時間	内容
15:00-15:05	Briefing
15:05-15:30	Review of the last year's program
15:30-16:45	Presentation by the participants (per his/her organization) 15 mins x 5
16:45-17:00	Break
17:00-17:30	Discussion on raised issues
17:30-17:50	Data collection
17:50-18:20	Group Discussion (each country)
18:20-18:40	Professional development as Math education expert / viewpoint of evaluation
18:40-19:00	Guidance for assignment

3.2 第一回と第二回ワークショップの間のフォローアップ活動

第一回と第二回ワークショップの間に、ザンビア、マラウイそれぞれ2回ずつフォローアップのオンラインミーティングを実施した。予備調査の計画および予備調査実施後のデータ分析に関することが主な議論内容であった。また、整数の加減や乗除の意味など、各国が本調査で主眼を置く数学の内容に関することについても理解を深めた。

表 10. 第一回と第二回ワークショップ間の国別オンラインミーティング

国	実施日	議論内容
ザンビア	2020.11.12	予備調査計画書のレビュー ・調査を通じて明らかにする点の明確化 ・カリキュラム改定を念頭に置くことを再度確認。
	2020.11.19	・調査を通じて明らかにする点について確認。 ・調査実施日数、対象校、チーム分けの検討 ・掛け算・割り算の意味に関する議論 ・Zoom ミーティングにかかる通信費に関する要望
マラウイ	2020.11.12	調査計画書のレビュー ・取り上げる問題点について先行研究の検討 ・調査を通じて明らかにする点の明確化 ・調査計画の見直し
	2020.12.4	・マラウイから試験調査の実施報告 ・試験調査結果のデータ分析の方向性について検討 ・週報に記載してほしい視点の説明

3.3 第二回ワークショップ

2020年12月10日に第2回ワークショップを実施した。各国が予備調査の結果について発表し、議論した。そのことは、第三回ワークショップに向けて、何を深めていくべきなのかについての課題を明らかにすることを目的とした。さらに、その課題について考察を深めるために、数学概念の展開と研究方法（カリキュラム・教科書分析と授業分析）について講義を行った。

表 11. 第二回ワークショッププログラム

15:00-15:15	Opening remarks and review of previous session
15:15-15:45	Reflection and professional development of yourself
15:45-17:15	Presentation by each country 30 minutes (20 minutes presentation and 10 minutes Q&A) - Zambia - Malawi
17:30-17:55	Mathematics curriculum: core concepts in number domain
17:55-18:20	Methodology of curriculum and textbook analysis
18:20-18:45	Methodology of lesson analysis
18:45-19:00	Way forward

3.4 第二回と第三回ワークショップの間のフォローアップ

第二回と第三回ワークショップの間に、ザンビア 1 回、マラウイ 2 回オンラインミーテ

ィングを実施した。本調査の計画および調査実施後の分析に関することが主な議論内容であった。加減の問題で扱う数字など、内容の本質に関わる部分について理解を深めた。

表 12. 第二回と第三回オンライン研修間の国別オンラインミーティング

国	実施日	議論内容
ザンビア	2021.1.22	<ul style="list-style-type: none"> ・ 本調査の実施に関して、調査範囲、実施方法等を議論 ・ 予備調査の分析結果について意見交換 ・ 最終発表に向けて方向性の確認
マラウイ	2020.12.18	ツールの改定、調査対象校とデータの規模、分析方法の見直し、予算の明確化
	2021.2.2	<ul style="list-style-type: none"> ・ 本調査のデータ分析 ・ 今後の進め方（本研修の着地とその後）について議論

3.5 第三回ワークショップ

2021年2月18日に第3回オンライン研修を実施した。各国が本調査の結果および調査から得られたカリキュラム改定に向けた示唆について発表し、議論した。さらに、本研修を通して学んだことや反省点についてそれぞれの考えを共有した。本研修でICTツールの一つとして活用したMLを今後も継続的に使用し、本研修で形成されたコミュニティを維持していくことを確認して本研修を締めくくった。

表13. 第三回ワークショッププログラム

15:00-16:20	Final presentation by each country 40 minutes (20 minutes presentation and 20 minutes Q&A) for each country - Zambia - Malawi
16:20-16:40	Break
16:40-17:00	Comments and discussion on raised issues
17:00-18:00	Group reflection on the whole course setting next assignment and action plan
18:00-18:20	General comments
18:20-18:50	Evaluation Meeting
18:50-19:00	Closing

第4章 成果

4.1 ICTサービスの活用に関する成果と課題

第2章で述べた、ICTサービス（ML、Facebook、Dropbox、Zoom）の活用計画に関し、想定通りに機能した部分及び機能しなかった部分について考察する。

表14および表15は、ICTサービスの中で効果的に機能したMLとZoom会議について、各国の使用状況をまとめたものである。全期間を通じて、MLによって継続的なコミュニケーションをとれたといえ、調査計画の改定や調査の事前事後など、より踏み込んだ議論が求められる場面ではZoomでの会議を設定し、研修の質を高めてきたことが読み取れる。第一回から第二回ワークショップ間のML発信数が後半に比べ多くなっていることから、仮説の設定から調査実施に向けて活発な議論がなされたことが分かる。またザンビアについて、第二回ワークショップ以降の活動が停滞しているが、学校閉鎖のため予定していた調査実施の見通しが立たなかったことが原因であると考えられる。

表16は各ICTサービスの活用結果と、それに至る理由および考察をまとめる。

表14. マラウイの活動とICTサービスの活用

ワークショップ	①2020/10/29	②2020/12/10		③2021/2/18		
	11/6 調査計画初稿	12/2-3 予備調査		1/12-13,19 本調査		
Zoom会議日	2020/11/12	2020/12/4		2020/12/18	2021/2/2	
研修員のML 発信数	11件	16件	3件	10件	7件	3件
	計30件			計20件		

表15. ザンビアの活動とICTサービスの活用

ワークショップ	①2020/10/29	②2020/12/10		③2021/2/18	
	11/7 調査計画初稿	11/26-27 予備調査		2/5 本調査	
Zoom会議日	2020/11/12	2020/11/19		2021/1/22	
研修員のML 発信数	18件	4件	9件	7件	13件
	計31件			計20件	

表 16. ICT サービスの活用結果

ICT サービス	活用結果	理由・考察
ML	<ul style="list-style-type: none"> ・週報および調査にかかる資料の提出、研修員と研修実施者との意思疎通に活用された。 ・週報や ML での発言は 101 件（表 14・15 に示す期間内、エチオピア除く）と、積極的な参加が見られた。 ・研修実施者側からの特定国に対する意見やコメントを、他国の研修員も確認し活動に反映するなど、自国についての学びを相対化させ、深みを与えることとなった。 ・学校閉鎖など予期せぬ事態の際も、ML で情報が参加者全員で共有されることによって、対応策の検討が即座に行えた。 	<ul style="list-style-type: none"> ・電子メールの送受信は、研修員にとって日常のものであり、それを通じた情報共有は既に習慣化されたものであったと考えられる。
Facebook	<ul style="list-style-type: none"> ・全研修員の内、6 名（ザンビア 4 名、エチオピア 2 名）が非公開グループに参加した。マラウイの参加はなかった。 ・研修員からの投稿として、ザンビアが予備調査の活動写真を 2 度投稿したのみであった。 ・研修実施者から 7 回、日本での打ち合わせ写真や各国の活動状況を知らせる投稿を行った。 ・各投稿に対し、研修員からの活発なコメントは得ることができなかった。 	<ul style="list-style-type: none"> ・ Facebook を利用していない、また利用することに興味を持たない研修員が複数いた。 ・多忙な仕事の合間に調査を行うことに追われていて、それ以上に活動を見せることに割く時間と興味が喚起できなかった。
Dropbox	<ul style="list-style-type: none"> ・格納されたドキュメントに対し、研修員間でコメントのやり取りは見られなかった。 ・研修員がストレージにアクセスした回数は数えるほどであると考えられ、活動プロセスの可視化と省察の助けにはならなかった。（この点は週報 	<ul style="list-style-type: none"> ・コメントを付加するためにはログインする必要があり、その手間が利用を敬遠させたのではないかと推察する。 ・各研修員は本業と並行して調査に向けた資料作成や

	や Zoom での議論が補った。) <ul style="list-style-type: none"> 資料を一括管理するアーカイブとしての役割は、計画段階での狙い通りであり、研修員が過去の資料を参照する助けとなった。 	調査の手配・実施をしなればならず、他国の資料を確認し意見を出す余裕がなかったと考えられる。
Zoom	<ul style="list-style-type: none"> ワークショップの全 3 回とフォローアップ期間中に 7 回活用された。 ML などのテキストベースでは共有されない、テキスト化されない、背景にある意図や試行錯誤を会話により引き出すことが可能となった。 会話によって深い議論や試行錯誤を促すことに有効であった。 	<ul style="list-style-type: none"> Web を介しているがリアルタイムかつ顔の見える対話の場が、研修員と研修実施者双方に必要とされていたと考えられる。

以上の通り、ML と Zoom は計画段階で意図された通りに働いた。Dropbox は研修実施者にとっては有効であったものの、研修員にとって有効に働いたとは言えない。Facebook も同様である。表 8 のとおり、Dropbox と Facebook は非同時双方向のコミュニケーション基盤を意図したが、主に研修実施者が情報提供する単方向の活用結果となった。オンラインストレージと SNS を活用したコミュニティ形成については、今後さらに効果的に活用するため検討する必要がある。

最後に、第 2 章 2 節の (3) 研修目的と ICT サービスとの関係性にて、計画時に意図したことに対する成果として、ICT サービスの活用結果を全体として捉えておきたい。

まずエビデンス・ベーストとプロセスの可視化という 2 つの焦点について述べる。Dropbox は研修期間中にやり取りされた文書をアーカイブする基盤として働いた。しかし、研修員が Dropbox へアクセスした回数は少なく、研修員が活動の過程を振り返り、省察する助けとして ICT が機能したとは言い難い。また ML によって電子的に記録されたコミュニケーションは、研修員の実施プロセスを可視する働きをし、実施者評価のエビデンスとして有益であった。コミュニティの創出を狙い設定されたソーシャル・ネットワーキング・グループ (ML、Facebook、Dropbox) のうち、ML は活発に活用された。研修員は電子的に交わされるやり取りを受信し、新たな知識や様々な実践を知り活動に反映させた。それは直接自己の活動と関係するやり取りではなかったとしても、コミュニティの知として情報共有の機能は果たした。自身が発信者となりコミュニティ内で議論を生むという、応用的段階には至らなかったが、ML によってコミュニティ形成の初期段階をみることができた。

4.2 研修目的に対する成果と課題

本節では、本研修を通して得られた成果について、第2章で述べたルーブリックの4領域の観点から、研修を通して得られたエビデンス（週報・調査計画書・中間および最終報告書・Zoom会議や講義の議事録など）に基づき、分析・記述する。

① 知識・技能

【マラウイチーム】

調査計画および中間報告資料・本調査計画書・最終報告書の変容過程は表17と表18の通りである。調査計画の変容過程（表17）では、はじめに、現行のカリキュラムを分析し、課題を同定する過程でKCCに関する学びが見られた。その後、調査計画の修正を通して、学習ストラテジーの具体例の記述や、Counting all ストラテジーを用いた指導法の課題に関する議論が行われたことによりKCS、KCTに関する学びが見られた。また、調査で使用する問題を厳選する過程で、加法・減法の問題パターンの分析を行ったことにより、SMKに関する学びも見られた。

さらに、中間報告資料・本調査計画書・最終報告書の変容過程（表18）では、はじめに、現地調査の結果から教師の用いる指導法および生徒の学習ストラテジーについて明らかにするなかで、KCS、KCTに関する学びが見られた。その後、予備調査で得られたデータを参考にしながら、本調査で用いる調査ツールの改定作業を行っている。そこでは、加法関係に関して新たに加数や減数を問う問題を加えることを検討し、その過程でSMKに関する学びが見られた。また、Counting all よりも効率的なストラテジーを引き出す問題の追加を検討する過程でKCS、KCTに関する学びが見られた。そして、最終報告書では、本調査で得たデータを考察する視点として、十進位取り記数法と生徒のコンセプションに関する先行研究のレビューからSMK（HCK）、KCSに関する学びが見られた。また、本調査の結果に基づくカリキュラム改定への提言に関する議論から、KCCに関する学びが見られた。

このように、カリキュラムに関する知識のみならず、数学教育専門家に必要な知識・技能を包括的に学んでいたことがわかる。また、それぞれの知識が形成される学びの契機は、必ずしも日本側のインプットによるものである場合だけではなく、現地調査の結果によるものである場合や、ザンビアチームからの学びによる場合もあった。このことから、研修員が日本側のインプットから得られた知識について、現地調査を通して活用・検証するとともに、さらには、同様の課題を有する他国から得た知識を自国の課題解決に応用していたことがわかった。

【ザンビアチーム】

調査計画および中間報告資料・本調査計画書・最終報告書の変容過程を表19と表20にそれぞれ示す。調査計画の変容過程（表19）では、最初は研修員の経験による漠然とした問題意識であったが、調査計画の修正を通して、現行のカリキュラムおよび分析し、課題の同定を行うことによりKCCに関する学びが見られた。また、Zoom会議（11月12日）で

は、乗法および除法の意味に関する議論が行われた。ここでは、研修実施者により、かけ算の本質的な意味と同数累加が区別されることや、等分除・包含除について知見が共有された。このインプットを経て、SMK 中の CCK 及び SCK に関する学びが見られたことにより、ザンビアの教科書およびそれを使用する教師が乗法・除法の意味を十分に指導できていないという問題意識をより具体化することができた。

さらに、中間報告資料・本調査計画書・最終報告書の変容過程（表 20）では、授業案の分析及び授業観察により教師の乗法および除法の導入に関する考察を通して、現行のカリキュラムおよび分析し、課題を同定する過程で KCC 及び KCT に関する学びが見られた。その後、本調査の中で、カリキュラムおよび教科書の分析、さらには意図されたカリキュラムと実施されたカリキュラムのギャップについて考察する過程を通して、KCC 及び KCT に関する学びをさらに深めることができた。

SMK に関する知識は主に日本側のインプットが契機となったが、PCK に関する学びはマラウイと同様に、必ずしも日本側のインプットによるものである場合だけではなく、現地調査の結果によるものである場合や、他国からの学びの影響によるも多く含まれることが明らかとなった。

表 17. マラウイの調査計画の変容過程

	調査計画 (第一校) 11月6日	調査計画 (第二校) 11月23日	調査計画 (第三校) 11月27日
調査内容	<ul style="list-style-type: none"> 低学年の算数の低学力（具体的な学力調査結果の提示なし） <u>加法関係の問題解決のための学習ストラテジーが限定的である(KCC)</u>（先行研究の検討なし） 	<ul style="list-style-type: none"> 低学力のエビデンスとなる具体的な学力調査の結果に関する先行研究の提示 <u>加法関係の問題解決のための学習ストラテジーが限定されている事例の具体例の記述(KCS,KCT)</u> <u>先行研究に基づき、Counting all ストラテジーに限定された指導の課題について言及(KCT)</u> 	(変更なし)
調査方法	<ul style="list-style-type: none"> 加減の問題のオーラルアセスメント（生徒） 指導法および生徒のミスコンセプションに関するインタビュー（教師） 授業観察ガイドラインおよび教師指導案やノードの分析ガイド 	<ul style="list-style-type: none"> <u>加減の問題のオーラルアセスメントの問題の厳選(SMK)</u>（生徒） 加減の問題の指導法及び生徒が使用するストラテジーに関するインタビュー（教師） 授業観察ガイドラインおよび教師指導案やノードの分析ガイド 	(変更なし)
日本側の インプット	<p>【メール・Zoom 会議（11月12日）】</p> <ul style="list-style-type: none"> 低学力の課題及び加法関係の学習ストラテジーに関する先行研究の検討 教師用インタビューと生徒用オーラルアセスメントの関連付け オーラルアセスメントおよびインタビュー内容の焦点化 	<p>【メール】</p> <ul style="list-style-type: none"> 調査日数および予算計画の修正 	<p>【メール】</p> <ul style="list-style-type: none"> 調査計画およびツールの承諾、JICA 事務所への提出依頼

表 18. マラウイの中間報告資料・本調査計画書・最終報告書の変容過程

	中間報告資料 12月10日	本調査計画書 1月8日	最終報告書 2月18日
調査内容	<ul style="list-style-type: none"> 低学力のエビデンスとなる具体的な学力調査の結果 加法関係の問題解決のための学習ストラテジーが限定されている事例の具体例の Counting all ストラテジーに限定された指導の課題 	(変更なし)	<ul style="list-style-type: none"> 低学力のエビデンスとなる具体的な学力調査の結果 <u>十進位取り記数法とそ生徒のコンセプションに関する先行研究のレビュー</u> (SMK,KCS) Count-all ストラテジーに限定された指導の課題
調査方法	<ul style="list-style-type: none"> 加減の問題のオーラルアセスメント (生徒) 指導法および生徒のミスコンセプションに関するインタビュー (教師) 授業観察ガイドラインおよび教師指導案やノードの分析ガイド 	<ul style="list-style-type: none"> <u>加数や減数を問う問題を追加 (SMK)</u> <u>Counting all よりも効率的なストラテジーを活用・指導できるか、引き出す質問の追加 (KCS,KCT)</u> 授業観察ガイドラインおよび教師指導案やノードの分析ガイド 	(変更なし)
調査結果	<ul style="list-style-type: none"> <u>インタビューおよびオーラルアセスメントの結果から、教師が用いる指導法が Counting all ストラテジーのみであり、生徒も同様のストラテジーを使用していることを導出 (KCT,KCS)</u> 	(本調査未実施のためなし)	<ul style="list-style-type: none"> 予備調査同様、教師と生徒が用いるストラテジーが Counting all に集中していると同定 <u>三層のカリキュラムの相互関係と調査結果に基づくカリキュラム改定への提言 (KCC)</u>
日本側の インプット	<p>【第2回講義・Zoom会議 (12月18日)】</p> <ul style="list-style-type: none"> ツールの改定 (Counting all よりも効率的なストラテジーを活用・指導できるか、引き出す質問) 調査対象校とデータの規模 分析方法の見直し 予算の明確化 	<p>【メール・Zoom会議 (2月2日)】</p> <ul style="list-style-type: none"> 本調査のデータ分析結果の解釈 報告書の構成 3層のカリキュラムの関係性 (ザンビアチーム向けの資料から得られた示唆) 加法関係の学習ストラテジーに関する先行研究の共有 	<p>【第3回講義、メール】</p> <ul style="list-style-type: none"> 加法関係の学習ストラテジーの発達段階の検討 調査結果とカリキュラム改定への提言の関連性

表 19. ザンビアの調査計画の変容過程

	調査計画 (第一校) 2020年11月10日	調査計画 (第二校) 2020年11月22日	調査計画 (第三校) 2021年1月27日
調査内容	<ul style="list-style-type: none"> 乗法・除法の導入に関し、教科書と実際の指導のギャップ (KCC, KCT) 	<ul style="list-style-type: none"> 乗法の意味に関する先行研究 (SMK) 乗法・除法の導入に関し、教科書と実際の指導のギャップ (KCC, KCT) 	<ul style="list-style-type: none"> カリキュラムおよび教科書分析 乗法の意味に関する先行研究 カリキュラム、教科書、教師の指導に関するギャップの原因
調査方法	<ul style="list-style-type: none"> 授業案の分析 授業観察 教師へのインタビュー . 	変更なし	<ul style="list-style-type: none"> カリキュラムおよび教科書の分析 (KCC) 授業案の分析 (KCT) 授業観察 (KCT) 教師へのインタビュー
日本側の インプット	<p>【メール・Zoom 会議 (11月12日)】</p> <ul style="list-style-type: none"> 乗法・除法の意味 リサーチクエスションの明確化 カリキュラム・教科書分析の必要性 インタビュー内容の焦点化 	<p>【メール】</p> <ul style="list-style-type: none"> 調査計画およびツールの承諾、JICA 事務所への提出依頼 	<p>【メール・Zoom 会議 (1月22日)】</p> <ul style="list-style-type: none"> 3層のカリキュラムの関係性 カリキュラム、教科書、教師の指導に関するギャップの原因の考察

表 20. ザンビアの中間報告資料・本調査計画書・最終報告書の変容過程

	中間報告資料 12月10日	本調査計画書 1月8日	最終報告書 2月18日
調査内容	<ul style="list-style-type: none"> 乗除の導入に関する以下の分析 <ul style="list-style-type: none"> 教科書の記載 教師の理解 教師の授業計画および実施 	<ul style="list-style-type: none"> 乗除の導入に関する以下の考察 <ul style="list-style-type: none"> カリキュラムの記載 教科書の記載 教師の理解 教師の授業計画および実施 	<ul style="list-style-type: none"> 乗除の導入に関する以下の考察 <ul style="list-style-type: none"> カリキュラムの記載 教科書の記載 教師の理解 教師の指導計画および実施 カリキュラム改定への提言
調査方法	<ul style="list-style-type: none"> 教科書分析 (KCC, KCT, SMK) 教師の理解に関し、半構造化インタビュー 授業案の分析および授業観察 	<ul style="list-style-type: none"> カリキュラム分析 (KCC) 教科書分析 (KCC, KCT, SMK) 教師の理解に関する半構造化インタビュー 	(変更なし)
調査結果	<ul style="list-style-type: none"> 教科書により、乗除の意味の説明にばらつきがある。(KCT, SMK) 教師は教科書に記載の意味のみ理解している。(KCT, SMK) 教師は教科書通りに教えている。(KCT) 	<ul style="list-style-type: none"> カリキュラムの記載の内容と教科書の内容に差がある。(KCC, KCT, SMK) カリキュラムや教科書の解説書がないために、教師は理解を深めることができない。 	<ul style="list-style-type: none"> カリキュラムに記載の内容が明確でないことが原因と特定し、<u>カリキュラム改定への提言 (KCC)</u> カリキュラムの説明書および教師用指導書の開発を提案
日本側の インプット	【第2回講義・Zoom会議 (1月22日)】 <ul style="list-style-type: none"> 乗除の意味 3層のカリキュラムの関係性 インタビュー方法 (理由を聞き出すための質問を入れる) 予算の明確化 	【メール】 <ul style="list-style-type: none"> 本調査のデータ分析結果の解釈 報告書の構成 	【第3回講義、メール】 <ul style="list-style-type: none"> 3層のカリキュラムの関係性 調査結果とカリキュラム改定への提言の関連性

② 計画・実施・分析のプロセス

本研修において実施された調査の概要は表 21 の通りである。研修員は 4 か月間の遠隔研修を通して、調査の計画・実施の一連のプロセスを経験することができた。

調査に先立ち、国別のチーム毎に、課題および仮説の設定を行った。第一校の調査計画では、どちらのチームも課題が十分に焦点化されていなかったため、「何が課題なのか、なぜそのような課題があるのか」という点について Zoom 会議やメールを活用して問題提起や議論を行った。例えば、マラウイチームの場合、調査計画第一校の提出が行われた後、研修実施者により提出されたファイルにコメントを記載する形で、「マラウイの児童の学力調査のレビュー」や「加法関係の学習ストラテジーに関する先行研究のレビュー」による課題の明確化の必要性について問題提起がなされた。その後、Zoom 会議（11 月 12 日）では、上記のような課題の明確化が必要である理由について議論を行った。その結果、調査計画第二校では、研修員はマラウイの児童の低学力という課題が低学年の学習内容が十分に習得されていないことに起因するということを学力調査のレビューに基づき追記した。さらに、加法関係の学習において多様なストラテジーが存在するが、マラウイで一般的に使用されている Counting all ストラテジーでは、加法概念の習得に不十分であることを先行研究に基づき追記した。このように、Zoom 会議やメールを活用することで、研修員は課題を明確化する過程を経験することができた。また、調査手法に関わって、自分たちの手で実施可能な標本数や調査手法について現実的な視点をもって検討をすることにより、調査の実現可能性の重要性について理解を深めることができた。

データの収集では、研修員全員が実際に学校に足を運び、予備調査および本調査のデータを集めることができた。そのことは後述する学びの根付きを与えた。ザンビアチームは授業観察や教師へのインタビュー、マラウイチームは生徒へのオーラルアセスメント、教師へのインタビュー、授業観察を行い、データを収集することができた。

その後、集めたデータについてチームで協働しながら分析を行った。インタビューや授業観察のデータについて体系的に分析する手法について講義を通して共有することで、研修員は客観的なエビデンスとしてのデータを蓄積する方法や分析手法について学ぶことができた。

また、2019 年度研修が抱えていた「抽象的な活動計画」という課題に対して、得られた結果に基づきカリキュラム改定への提言を作成し、最終報告書にまとめることができた。具体的には、ザンビアチームは「乗法関係の概念形成に必要な指導法をカリキュラムに記載するとともに、それに基づき教科書および教師用指導書が開発されること」を提言することができた。また、マラウイチームは「Counting all ストラテジーのみではなく、児童の数学的思考方が向上される多様なストラテジーについてカリキュラムが記載すること」を提言することができた。

このように、本研修を通して経験した調査の計画・実施に係る一連のプロセスそのものや、そこで得た調査のスキルは、数学教育の他領域や新しい課題に関する調査においても応用

可能である。数学教育の他領域とは今回の研究で扱わなかった「数と計算」以外の領域のことを示し、新しい課題とは今後のさらなるカリキュラム改定での問題同定の過程を想定している。特に、後者については、カリキュラム開発が永久に続く改善のプロセスであるという立場に立てば、刻々と変化し続ける社会や子ども、教えるべき教科内容の変化（例：日本の初等教育での統計やプログラミング）に応じて、問題を同定していくことが求められるだろう。したがって、本研修を通して得られた計画・実施のプロセスに関する専門的な学びは、継続的な職能開発の観点からも重要な学びであったことがわかる。

表 21. 両国の調査の概要

	ザンビア	マラウイ
調査時期	<p>【予備調査】</p> <ul style="list-style-type: none"> 11月26日, 27日 (2日間) <p>【本調査】</p> <ul style="list-style-type: none"> 2月5日 (1日間) 	<p>【予備調査】</p> <ul style="list-style-type: none"> 12月2日, 3日 (2日間) <p>【本調査】</p> <ul style="list-style-type: none"> 1月12日, 13日, 19日 (3日間)
調査場所	<p>【予備調査】</p> <ul style="list-style-type: none"> Chongwe Primary School, Handbar Kapotwe Primary School <p>【本調査】</p> <ul style="list-style-type: none"> Kabulonga Primary School, Kamwala Primary School 	<p>【予備調査】</p> <ul style="list-style-type: none"> Domasi Demonstration Primary School <p>【本調査】</p> <ul style="list-style-type: none"> Domasi Govt Primary School, Mchengawedi Primary School
対象	<p>【予備】</p> <ul style="list-style-type: none"> 教師 2名 <p>【本調査】</p> <ul style="list-style-type: none"> 教師 2名 	<p>【予備】</p> <ul style="list-style-type: none"> 小学校1年生 (8名)、小学校2年生 (8名)、教師 2名 <p>【本調査】</p> <ul style="list-style-type: none"> 小学校2年生 (20名)、小学校3年生 (10名)、教師 3名
調査内容	乗法関係の指導方法に関する教師の認識と教科書活用の実態について	加法関係の問題解決のための学習ストラテジーについて
調査手法	半構造化インタビュー、授業観察、教科書・指導案・ノートの分析	オーラルアセスメント、半構造化インタビュー、授業観察および授業案・ノートの分析
結果	<p>【予備調査】</p> <ul style="list-style-type: none"> 教師は教科書に書いている指導方法に準じて乗法関係の概念の指導をしている <p>【本調査】</p> <ul style="list-style-type: none"> 予備調査同様、教師は教科書に書いてある指導方法に準じて乗法関係の概念を指導している 教師は教科書に書いている指導法のみでは、乗法関係の概念を指導するのに不十分であると認識している 	<p>【予備調査】</p> <ul style="list-style-type: none"> 生徒、教師ともに Counting all ストラテジーを用いている <p>【本調査】</p> <ul style="list-style-type: none"> 予備調査同様、生徒、教師ともに Counting all ストラテジーを用いている 生徒は教師が指導していないストラテジーを用いることができる場合がある
カリキュラムに対する提言	<ul style="list-style-type: none"> 乗法関係の概念形成に必要な指導法をカリキュラムに記載するとともに、それに基づき教科書および教師用指導書が開発されること 	<ul style="list-style-type: none"> Counting all ストラテジーのみではなく、児童の数学的思考方が向上される多様なストラテジーについてカリキュラムが記載すること

③ 専門家意識 (Professionalism)

本研修では週報の作成を通じた省察に取り組んだ。研修員に共有した週報のフォーマットは添付資料3の通りである。クリスマス休暇（12月後半から1月前半）や、新型コロナウイルスの影響で調査に関連する活動が十分に行えなかった時期（ザンビアの1月）や、所属先の業務や最終報告書の作成により多忙であった時期（マラウイの2月）を除き、表22の通り、週報が提出された。⁵

表 22 提出された週報の数

	11月	12月	1月	2月	合計
マラウイ	4	2	3	0	9
ザンビア	4	3	0	1	8
エチオピア	1				1

週報を活用し、研修員による自己評価と研修実施者による実施者評価が行われた。自己評価では、研修員自身が計画、実施、考え、反省し、その結果として次週に取り組むことについて、ルーブリックの四領域の観点を中心に置きつつ、具体的に記述をすることととらえた。この自己評価（記述）によって、研修員は自身の専門家意識の形成をメタ的に捉えることに取り組んでいた。

また、研修実写者による実施者評価では、週報に記述された省察をルーブリックの四領域の観点から分析し、専門家意識の形成の様相を評価した。この実施者評価によって、研修実施者は研修員の専門家意識の様相をモニタリングすると共に、研修員を支援する際の手立てを検討した。以下、自己評価の記述内容に基づいて、研修員の専門家意識の形成に関する実施者による評価を述べる。

専門家意識 (Professionalism) は、1) 倫理と責任、2) 省察を通じた継続的職能開発の二つの小領域からなる。本研修から得られた研修員による自己評価から得られたエビデンスと、それに基づき行った実施者による評価は下記の通りである。

まず、1) 倫理と責任に関連して、マラウイチームは第一校の調査計画策定時に、予算計画の明確化や調査スケジュールの作成に取り組んだ。それについて、マラウイチームは週報において、下記のように記述をしている。

“...The second meeting was hugely aimed at identifying aspects of the draft survey concept which could be reworked or removed in order to minimize expenditure. In view of the feedback given, we resolved on a number of issues... We will also revisit our budget following JICA financial guidelines and directions.”

(マラウイチーム週報, 11月第2週)

上記の記述から、調査計画の策定において規定のガイドラインを遵守し、専門家としての公共に対する責任を果たしながら職務にあたるべきと、省察が行われた、と実施者は評価した。

⁵ エチオピアは所属先であるエチオピア教育省の内部事情により参加継続が難しくなったため、11月の第一週の週報のみ提出している。

次に2)省察を通じた継続的職能開発に関連して、ザンビアチームは第2回の講義後の週報において、下記のように記述している。

"I learnt a lot during the process of data analysis and report writing for the mini survey. In addition to that, I was also reminded about the goals of our survey during reflections of the last meeting such (as) use of suitable tools for our survey."

(ザンビアチーム週報, 12月第2週)

※カッコ内は筆者による追記

上記の記述から、本研修を通して行う調査の目的について、計画作成時のみならず、第2回の講義を通して、継続的に省察し、目的に応じた調査ツールの使用について学びを深めていたと実施者は評価した。このような、本研修の活動についての継続的な省察に加えて、本研修の活動を通して得た学びをカリキュラム開発の文脈で一般化するような省察も見られた。以下は、マラウイチームが本調査を実施した後に記述した週報の内容である。

The data collection exercise I carried out this week added a lot of value towards my professional development. In the course, I was able to reflect on what we have included in our primary mathematics curriculum for this level in relation to what learners were able to do versus what I thought learners would do at this level. All these experiences are important in the work of curricula reviews.

(マラウイチーム週報, 2月第2週)

上記の記述から、本研修の活動を通して得た、意図されたカリキュラム (what I thought learners would do) と達成されたカリキュラム (what learners were able to do) の関係性を捉えるという視点が、カリキュラム開発を行う数学教育専門家としての職能開発において重要であるということ省察することができたことがわかる。以上のように、週報から得られた自己評価による記述をエビデンスとし、実施者は本研修を通して研修員が専門家意識の形成に取り組んでいたことを評価した。

④コミュニティ

本研修では、国内の教育関係者とのコミュニティ (国内コミュニティ) および国をまたぐ教育関係者とのコミュニティ (国際コミュニティ) の形成に焦点を当てた。国内コミュニティに関しては、研修を通して同じ国の参加者同士が協働しながら調査を計画・実施するなかで、研修員同士のつながりが生まれた。さらに、実際に調査で学校に出向いたことにより、学校関係者とのつながりをもつきっかけをもつこともできた。日本における数学教育専門家にとってもこのことは重要である。考察することに具体的イメージを与えるとともに、それによって考察をさらに深めることができるのである (野中&竹内, 1996)。

また、国際コミュニティに関しては、それぞれの国の研修員は、添付資料4にあるように240件のメーリングリストによる意見交換やZoomによる会議を通して、日本側の講師と密接なつながりを持つことができた。また、日本側から得た学びのみではなく、他国の研修員から得た学びを研修において活用す

る事例もあった。たとえば、マラウイチームは、ザンビアチームが最終報告書の執筆において三層のカリキュラムの関係性に着目して調査結果と提言をまとめることについて、メーリングリストの内容および添付ファイルから確認していた。そして、マラウイチームはこのアイデアが自国の調査結果と提言をまとめる過程においても有用であると判断したことを Zoom 会議で日本側の研修実施者に報告し、最終報告書において上記の視点を盛り込んだ提言をまとめた。マラウイチームがこのような判断を行った背景には、研修員が昨年度の研修から得た知見を活かして、本年度の研修に参加していたということがある。実際に、当該の研修員は、日本側との Zoom 会議において、「昨年度の研修で、三層のカリキュラムの関係性を見るという視点について知り、本調査はまさにそのことを示していると思ったから」と、上記の判断を行った理由について説明していた。このことから、昨年度の本邦研修から得た学びを本年度の本研修において応用しつつ、他国の研修員からも学びを得るなかで学びを深化させるとともに、国際コミュニティ形成の芽生えが生じていたと言える。

このように、研修員は、本研修を通して国内および国際コミュニティ形成のきっかけを得ることができた。繰り返しになるが、このような専門家によるコミュニティの形成に着目した国際教育協力手法はコロナ禍の今日においてのみ、希求されてきたわけではない。外務省（2010）は日本の国際教育協力の政策の有効なモデルとして、地域内および地域間の協力を促進する南南協力や、これに先進国が加わった三角協力を掲げてきたし、JICA（2010）はその好事例として SMASE-WECSA のネットワークを活用したネットワーク型協力を取り上げきた。このように、専門家集団の形成に向けた取り組みが今後の国際教育協力において求められているということは、政策や事業レベルでも議論されてきたことであり（石原, 2011）、その具体化は急務であったと言える。そういった意味で、上記で示されたような本研修の成果は、本研修が専門家集団の形成に寄与する可能性を有していることを裏付けており、新しい国際教育協力手法を提案したと言える。

4.3 考察

以上の本研修を通して得られた成果を踏まえて、次の四点について考察を行う。

(1) 学びの契機

本研修では、日本側の研修実施者によるインプットのみならず、研修員による現地調査、他国の研修員による現地調査や発言といった三つの異なる学びの契機が存在したことがわかる。日本側の研修実施者のインプットによる学びの契機では、研修員は専門的知識を習得・活用することを通して、課題意識を深化させていたと考えられる。また、現地調査による学びの契機では、研修員は現地調査の結果に基づき、カリキュラム改定への提言が検討することにより、課題意識を具体化していたと考えられる。さらに、研修員は他国の調査結果や発言を自国の調査結果と関連付けて解釈することにより、自国の課題を捉えるための視座を得ていたといえる。学びの深化・具体化は重要な学びであり、それらは上記の多様な学びの契機によって生み出されていたと考えられる。

(2) 学びの根付き

本研修は 2019 年度の研修のアドバンス研修として位置づけられていた。よって、2019 年度の研修から継続して参加していた研修員については、2019 年度の研修で得た三つの視座（社会、子ども、教

科内容)に基づき、カリキュラム開発過程を理解し、改善した数学カリキュラム案を策定する能力を活用し、現地の文脈において課題意識の深化・具体化に取り組むことが期待されていた。本研修では、研修に参加したすべての研修員が、実際に学校現場に足を運び、子どもや教師を対象としてデータ収集を行うことができた。これらの経験を通して得た学びが2019年度の学びの第0段階ともいえる実感と考えるための基盤を生み出したと言える。ここでは、従来型の研修における学びと本研修による学びが重なったことや、従来と現在の学びの関係に意識が行ったことを「学びの根付き」と呼んでいる。

(3) 課題意識の深まり

本研修を通して、研修員がもつ漠然とした課題意識は、より具体的・専門的な課題意識へと変容した。課題意識の変容過程では、週報や Zoom を用いた省察の機会などを通して、自己評価を行うことにより、研修員自身の学びに具体的なイメージを与え、学びを対象化していたと考えられる。このような課題意識の深まりといった学びの過程の記述は、研修実施者によっても評価されていた。これにより、適宜、研修実施者による研修員へのフィードバックがなされたことにより、課題意識の深化・具体化が促されたと考えられる。

(4) 場の設定とファシリテーション

本研修では、2019年度の訪日研修に参加した経験をもつ研修員と訪日経験のない研修員を意図的に組み合わせながら、各国の研修員のチーム作りを行った。この背景には、2019年度の訪日研修に参加した研修員が、実際に日本の教育現場を目で見て、肌で感じ、見聞きした経験を、本研修を通して各国の文脈で応用することを期待していた、ということがあった。また、訪日経験のある研修員と訪日経験のない研修員同士の学びの相乗効果が生まれることも画策していた。実際に、本研修ではマラウイの研修員が2019年度の研修との接続について、三層のカリキュラムの関係性を捉えるという視点が両者に存在していると明言したことから、上記のような研修実施者による意図的な場の設定は効果的に機能していたと考えられる。

また、本研修における重要な前提条件は、それぞれの研修員が「その場にいる（在地）」⁶ということである。研修において、在地を可能とするために ICT ツールの使用や、それらを用いた研修のファシリテーションの検討が不可欠な要素であった。

⁶① 現地にいること。また、その地に住む人、住んでいる土地。

② (みやこに対して) いなかの地。在郷。在所。

日本国語大辞典 (<https://kotobank.jp/dictionary/nikkokuseisen/1636/>)

第5章 提言

5.1 本研修の意義

2020年、コロナ禍によって、従来の訪日研修の実施が叶わなかったことを契機とし、オンラインによる遠隔研修が企画された。このような変化をもたらした全世界的な危機を否定的に受け止めるのではなく、従来の研修で生じていた課題に立ち返って考え、新しい研修手法を考察するきっかけを得たということに意味を見出すことが重要である。コロナ禍において与えられた環境として特徴的だったことの一つは、研修員の訪日が叶わない反面、研修員は現地において活動が可能であった(在地)ということである。研修員が現地にいるということは、現地での調査を通してカリキュラム開発の過程を経験できるという意味で、より広くはカリキュラム開発における内発性という意味で、もっとも重要な条件であったと言える。

オンライン研修は2021年2月をもって終了した。しかし、研修実施者および研修員は本研修を通して得られた調査結果について、研修終了後に現地のジャーナルに投稿する論文の執筆に取り組んでいる。もちろん、ここで執筆された論文を個人の研究業績として捉えることも可能ではあるが、むしろその価値は単なる個人的な業績には留まらない。本研修における調査を通して得られたような知見を、今後も継続して蓄積していける制度と文化(エビデンスに基づくカリキュラム開発 Evidence based curriculum development)を確立していくための第一歩であったと考えている。

5.2 今後のオンライン研修への提言

JICAの国際協力で重視してきた人づくり、また21世紀に入ってから重視されてきた制度作り(Institutional building)は、教育改善を図るうえで重要である。しかし各国が異なる歴史、文化を持つ中で、日本のやり方を一方的にこれらの国に押し付けるわけにはいかない。そこに今回は、コロナ禍という世紀に一度の危機があった。したがって、日本に来ることができない、つまり現地にいることを活かす方法を根本から考えようというのが発想のスタートであった。

課題別研修では、来日し研修を受けることが通例である。ところが、現地にいることは当然であり、そもそもJICAそして日本が国際協力の一環で研修を行うということ自体の意味が問われることとなる。日本に来ないにもかかわらず、日本が研修を行うことの意味である。この矛盾した、しかし根源的な課題の認識が、この研修の根底にあったと言えるだろう。

この「算数数学カリキュラム開発」研修の目指すことは、現地におけるカリキュラム開発専門家を育てること、彼らの中に現地のカリキュラム開発の専門的知識を育てることに尽きる。もちろん、既存のカリキュラムにコメントをして、そのカリキュラムの質を少し上げることが可能である。しかしカリキュラムもいずれかは改定される運命であり、その根本が分かっていると次回以降の改定は円滑に行われまい。これまでの改定のように、トピックを出し入れしたり、学年・学校段階間で動かしたりすることに終始してしまう可能性が大きい。

この現地における専門家や専門的知識を育てる上で、今回の経験は何を示唆したであろうか。

(1) Local knowledge(在地の知、地方固有の知)は、祭りや食物などその地域で長く形成されてきた知識を指している。そのことはコミュニティのアイデンティティや存続に関わってきたであろう。しかし本研修ではLocal Professional Knowledgeとしている。学校教育はそもそも近代の産物である。みんな

が学校に来て一緒に学ぶということは、19世紀から徐々に広がり、多くの開発途上国では学校制度そのものが植民地化のプロセスの中で持ち込まれた。そういった中で、既に存在するものもあるが、これから作る新しいものも含めて、Local Professional Knowledge としている。現地の学校の現状に基づく、しかし学校教育における専門的知識である。

今回の研修では、研修員が学校を訪問したうえで、その経験をもとに問題を語るという現象が起きていた。それを振り返る中で、より洗練された知識が形成されていくであろう。

(2) Evidence based curriculum development は近年カリキュラム開発のなかで議論される。注意しなければ、安易な考えに走り、データを取ることが本来の教育目的に優先してしまう可能性もある。しかし、開発途上国のカリキュラムを考える時に、先進国のカリキュラムの動向を単にまねるだけでなく、教室の実情を踏まえたカリキュラム開発が重要である。特に算数は単純な計算問題は調査がしやすいし、また一般にアピールしやすい。したがって(1)と関連して、データを取ることと Local professional knowledge を形成することを並進させ、それらに基づくカリキュラム開発を制度や文化として定着させる必要がある。

今回の研修では、基本中の基本ではあるが、加減(マラウイ)、乗除(ザンビア)について調査結果が得られた。これらのデータや調査を教育省の中で蓄積、議論し、それをカリキュラム開発に生かしていく制度の構築が求められる。

(3) 以上の二つの点を実現する方法として、訪日研修と在地研修を組み合わせることである。その時、ICT は大きな能力を発揮するであろう。

- ・ 訪日研修：日本の教育制度、教育開発の歴史、教育実践の視点を学び、自らの課題について考える
- ・ 在地研修：訪日研修の学びを、現地の制度開発、カリキュラム開発に接続する

そのためには、年度を越えた調整や関係者の関りが重要である。しかし21世紀に入って、科学技術が高度化し、社会が抱える課題も複雑化している。そういった中で研修の仕方を根本から考える必要がある時期に来ている。

【謝辞】

本研修参加者には、現地にて業務がある中で、自分の時間を割いて積極的に参加してもらったことに心から感謝を述べたい。色々か気付きを与えてくれたことが、研修を実施する上での大きなモチベーションになった。

また JICA 中国センター、JICA 本部、JICA 在外事務所の方々には、この場をお借りして御礼を申し上げたい。無理を言ったにもかかわらず、多くの便宜を図って頂いたおかげで、この新しい研修方法を実現することができた。

学校現場には直接いけなかったが学校現場の先生方や子どもたちに感謝を述べたい。いつか皆さんにとってより良い教育が届けられる日が日来ることを切に願っています。

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添付資料 1. 参加者名簿

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添付資料 2. ルーブリック

Domain	Contents	Level 1 Emergent stage	Level 2 Introductory stage	Level 3 Intermediate stage	Level 4 Mastery stage	Level 5 Application stage	Level 6 extensive stage
A: Knowledge・Skills	【A1】 Subject matter knowledge	A1.1 Demonstrate uncertain subject matter knowledge.	A1.2 Understand subject matter knowledge almost certainly.	A1.3 Understand subject matter knowledge certainly, and utilize knowledge in a limited way according to the purpose, contents, and methods of instruction.	A1.4 Deeply understand subject matter knowledge, and utilize knowledge in general according to the purpose, contents, and methods of instruction.	A1.5 Understand the connection between advanced mathematics as an academic discipline and the subject matters handled in mathematics of primary education, and make full use of connections according to the purpose, contents, and methods of instruction.	A1.6 Understand connections between advanced mathematics as an academic discipline, other related disciplines and the subject matters handled in mathematics of primary education, and make full use of connections to find academic value in the purpose, contents, and methods of instruction.
	【A2】 Knowledge of content and curriculum	A2.1 Demonstrate knowledge of educational goals, contents of teaching and evaluations stated in intended curriculum.	A2.2 Fragmentally acquire knowledge of educational goals, contents of teaching and evaluation stated in intended curriculum, and possess fragmentary knowledge about the systematicity of learning contents in a certain domain.	A2.3 Almost certainly acquire knowledge of educational goals, contents of teaching and evaluations stated in intended curriculum, and possess general knowledge about the systematicity of learning contents in a certain domain.	A2.4 Sufficiently acquire knowledge of educational goals, contents of teaching and evaluations stated in intended curriculum, and possess general knowledge about the systematicity of learning contents in all domains	A2.5 Critically consider the educational goals, contents of teaching, evaluations stated in intended curriculum, and possess knowledge about systematicity of learning content, including connections between one domain to another domain.	A2.6 Understand and critically consider the educational goals, contents of teaching and evaluation stated in intended curriculum including secondary education and other subjects, and possess comprehensive knowledge about systematicity of learning contents including intended curriculum after secondary education and other subjects.
	【A3】 Knowledge of student's learning, misconceptions and its causes	A3.1 Recognize student's various wrong answers	A3.2 Recognize student's misconceptions.	A3.3 Fragmentarily analyze student's interests, the process of understanding, misconceptions and its causes.	A3.4 Generally analyze student's interests, the process of understanding, misconceptions, and its causes.	A3.5 Analyze the student's interests, the process of understanding, misconceptions and its causes in relation to the situations of the own country (curriculum, teaching method, student).	A3.6 Analyze the student's interests, the process of understanding, misconceptions and its causes in relation to the situations of the own country (curriculum, teaching method, student), and be able to propose the plan for improving teaching.
	【A4】 Teaching method repertoire and its proper use	A4.1 Demonstrate a teaching method that is not corresponding with the purpose of teaching.	A4.2 Utilize teaching methods that are corresponding with the purpose of teaching to a certain extent, to teach some learning contents.	A4.3 Utilize teaching methods that are corresponding with the purpose of teaching, to teach almost all learning contents.	A4.4 Select teaching methods depending upon the purpose of teaching, and be able to teach while being aware of the advantages and disadvantages of the teaching methods.	A4.5 Set the purpose of teaching according to the situation of students in own country, and be able to teach while examining the advantages and disadvantages of the multiple teaching methods.	A4.6 Set the purpose of teaching according to the situation of students in own country, and propose a new teaching method accordingly.

B: Plan and the process of implementation	【B1】 Analysis of the current situation and planning of a lesson or survey	B.1.1	B1.2 Analyze the current situation, and develop tools for survey that is appropriate to a certain extent. (Matching the content to be investigated with the tools and methods for investigation, "validity")	B1.3 Analyze the current situation, and develop appropriate tools for survey.	B1.4 Develop appropriate tools for survey, and construct the plan for survey.	B1.5 Apply developed tools and plans for survey to other situations.	B1.6
	【B2】 Implementation of lesson and collection of data	B1.1	B2.2 Collect data of the implemented lessons although there is considerable gaps in the plan.	B2.3 Conduct lessons and collect data as planned to a certain extent, and be able to manage these data.	B2.4 Conduct lessons and collect data as planned to a certain extent, and be able to manage these data.	B2.5 Conduct lessons and collect data as planned, and be able to manage these data, and be able to deal with misalignment of the plan appropriately.	B2.6
	【B3】 Analysis and interpretation fo collected data	B3.1	B3.2 Analyze and interpret only the numbers (high score or low score, and etc.).	B3.3 Analyze and interpret data in relation to either curriculum, students, or teaching methods	B3.4 Analyze and interpret data in relation to the all of curriculum, students, and teaching methods.	B3.5 Analyze and interpret the situation in own country compared to other countries based on the interpretation of the data.	B3.6 Propose a new perspective of analysis based on the interpretation of the data.
	【B4】 Application of data	B4.1	B4.2	B4.3 Utilize evidences although the purpose and target of utilization are limited.	B4.4 Utilize evidences for appropriate purposes and targets.	B4.5 Effectively utilize evidences for appropriate purposes and targets.	B4.6 Develop plans for a next survey by utilizing evidences.

C: Professionalism	【C1】 Professional ethics and responsibility	C1.1 Awareness as a professional is emerged, however, code of ethics is not existed.	C1.2 Awareness as a professional is emerged, and code of ethics which formulated by aid organization is existed	C1.3 Aware to be a professional, and performe duties by meeting with the code of ethics that the own country has proactively formulated.	C1.4 Take responsibility for the public regarding research and practical effort, and its motivation and results, and performe duties by meeting with the code of ethics in own country.	C1.5 Take responsibility for the public regarding research and practical effort, and its motivation and results to go beyond the expectation from the public, and autonomously performe duties by meeting with the code of ethics in own country.	C1.6 Take strong responsibility to provide advanced and systematic professional knowledge and skills to the society as a professional, and performe duties autonomously while critically rethinking and reconstructing the code of ethics in own country.
	【C2】 Personal professional development	C2.1 Recognize professional development, however opportunities of professional development are not existed in own country and never participate it.	C2.2 Recognize professional development, and opportuniteis of professional development which formulated by aid organization are existed, and participate it.	C2.3 Be interested in own professional development, and be able to reflect on action to a certain extent through participating professional development that the own country has proactively formulated.	C2.4 Set short-term goals for own professional development, and be able to reflect on action and reflect in action through participating professional development that the own country has proactively formulated.	C2.5 Consider own professional development from meta-level, and reflect on and in action while being aware of medium to long term goals, and be able to actively engage in continuous professional development in own country.	C2.6 Rethink the process of own professional development, and be able to continuously explore the development of the next generation of professionals by restructuring the new framework of professional development in own country.
D: Community	【D1】 Vertical connection (Connection among educators in own country)	D1.1 Never participate in the community of educators in own country because such community is not existed in the country.	D1.2 Ever experience to participate in the community of educators in own country, which is formed by aid organization.	D1.3 Singly participate in the community of educators in own country, which is proactively formed by participants-selves.	D1.4 Participate in the community of educators in own country, which is proactively formed by participants-selves, and know new knowledge and various practices in the community.	D1.5 Continue to actively participate in the autonomous community of educators in own country, and form an individual's identity by sharing own knowledge and practices with other members.	D1.6 Continue to play a core role in the autonomous community of educators in own country, and contribute to the formation of individual and collective identities by taking leadership to create knowledge and improve practices.
	【D2】 Horizontal connection (Connection among educators across countries)	D2.1 Never participate in the community of educators across countries because such community is not existed.	D2.2 Ever experience to participate in the community of educators across countries, which is formed by aid organization.	D2.3 Singly participate in the community of educators across countries, which is proactively formed by participants-selves.	D2.4 Participate in the community of educators across countries, which is proactively formed by participants-selves, and know new knowledge and various practices in the community.	D2.5 Continue to actively participate in the autonomous community of educators across countries, and form an identity of own country by sharing knowledge and practices in own countries with other country members.	D2.6 Continue to play a core role in the autonomous community of educators across countries, and contribute to the formation of collective identity while sunstantiating and relativizing the identity of own country by taking leardership to create knowledge and improve practices.

添付資料3:各国毎の週報一覧

国名: マラウイ

報告期間: 2020年11月2日～11月6日

提出回数: 1

Objectives of the month

- To conceptualise the survey
- To develop data collection instruments.
- To trial test instruments developed for the survey
- To collect data from two primary schools (1 rural and 1 urban).

Objectives of the week

- To conceptualise the survey.
- To develop data collection instruments.

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	Discussed the survey approach	Points written down and tasks shared	Written points on the survey
Tue		✓	Drafting the survey concept	Ongoing	Ongoing
Wed					
Thu		✓	Drafting the survey concept	Ongoing	Ongoing
Fri		✓	Finalising drafting survey concept and data collection instruments	Survey concept and data collection tools drafted	Draft concept and data collection tools

研修実施者コメント

Nanae:
What kind of point of the survey did you find? If you can write little more details of the contents of discussion, it would be good materials for you to reflect your self and for us to know your effort.

Comments/feedback given by colleagues

Not yet, have submitted the draft to Mr Kusaka

Self evaluation for this week

Name	Comments
Tionge Saka	Was able to work on the assigned task. Did not complete the task by the day we agreed because of commitment to other tasks but I was able to complete it before the end of the week
Luke Eliya	Completed the task I was assigned before the end of the week. It was not possible to have the task completed within the day our team (pair) agreed because of other official commitments

Nanae:
We agree that you are very busy with many duties so you don't really have to worry if you can complete your task by deadline or not.
Rather, If you could mention your awareness of working on your tasks based on the PD framework, it would be good opportunity to start identifying your progress and challenges in this training from the perspectives of PD.

Team evaluation for this week

We were able to draft the survey concept and data collection tools. We assigned each other tasks and we both did the assigned tasks very well.

Plan for next week

Refine survey concept and data collection tools after getting input from colleagues through Mr Kusaka

Nanae:
If you had some collaborative interaction for making draft, you can mention its details.

Comments from the assistant

Thank you very much for the first submission of weekly report. We knew that you have started your project nicely. Since this is the training which more emphasize on "Evidence-based", your description of Weekly report also will be one of the evidences of your project in this training as well as your continuous professional development. In order to visualize the evidence what you have, you can go deeper your descriptions about the content of what you have done in this week. For example, Prof. Baba said, it would be appreciated if you could point out the content of discussion, contents of the tasks shared. We are looking forward to receive your report week.

Objectives of the month

- To conceptualise the survey
- To develop data collection instruments.
- To trial test instruments developed for the survey

Objectives of the week

- To collect feedback on the draft survey plan and data collection instruments.

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	Reviewed comments by Hiroshima University team on the draft survey	Isolated areas that need discussion to reach a common understanding	Written notes based on the comments
Tue		✓	Arranged for a zoom meeting with Hiroshima University team	Day for zoom meeting agreed – Thursday, 12th November 2020	Zoom meeting invitation email from Hiroshima University team
Wed					
Thu		✓	Discussed survey plan with Hiroshima University team through a zoom meeting.	Got feedback on the draft survey plan	
Fri		✓	Discussed logistical issues with JICA Malawi office	Advised to budget in line with JICA guidelines	JICA DSA guidelines.

研修実施者コメント

Nanae:
Thank you very much for describing a lot about the feedback in the box of comments! You can pick one of it as example here.

Comments/feedback given by colleagues

Yes. We got feedback on our draft survey concept from colleagues at Hiroshima University, and those from JICA Malawi Office. We were also engaged in two separate zoom meetings. The first meeting was organised by the Hiroshima University Lecturers and other colleagues whereas the second one was organised by JICA Malawi Office. The first meeting was aimed at clarifying our initial survey concept ideas, as well as the feedback we got on the same. The second meeting was hugely aimed at identifying aspects of the draft survey concept which could be reworked or removed in order to minimise expenditure. In view of the feedback given, we resolved on a number of issues. For example, we are going to explore students' ways of thinking on additive relationships in order to check the extent to which those ways of thinking have been included in our (Malawian) primary mathematics curriculum. We will continue refining our draft survey concept as well as data collection tools up to Week 3 of November, 2020. We will trial test our data collection instruments during Week 4 of November, 2020 so that by Week 2 of December, 2020, we are able to share our experiences from the trial testing. We are also going to collect data during weeks 2 and 3 of January 2021 because of change in our Academic Calendar (a fully fledged draft survey concept on all this will be shared next week). We will also revisit our budget following JICA financial guidelines and directions. We shared the work at hand between the two of us. Dr Saka is looking at the draft survey concept and workplan while Luke is taking care of the data collection instruments and budget. Before we do any submission of the merged draft proposal, we both relook at the work, make and work on each other's comments.

Nanae:
Great! Your description clarifies the finding from the meeting clearly. You can also mentioned why you have made such decision. You also clearly mentioned the process of working. This sentences visualized how you engage this training with the members of professional community.

Self evaluation for this week

Name	Comments
Tionge Saka	The discussion we had with colleagues assisted in having a shared understanding of the survey. The discussion and comments from both Hiroshima team and JICA Malawi office revealed grey areas in the survey plan which I will deal with in week 3.
Luke Eliya	Through the comments from colleagues, I was able to identify areas which I need to revisit. I intend to complete this task next week (Week 3 of November, 2020)

Team evaluation for this week

Through the feedback we got from colleagues, and the zoom meetings we attended, we were able to identify areas which we need to rework in order to improve the draft survey concept. This will assist in improving the quality of the survey. The objective for the month have also been revised based on the feedback we got (data collection has been pushed to January 2021).

Nanae:
This is very nice you revisited your objectives of the month and revised it continuously.

Plan for next week

Refine survey concept and data collection tools in view of the feedback given

Comments from the assistant

Thank you very much for the very detailed weekly report, especially about the comments and feedback given by the colleagues. You clarified that how you organized your activities and what you find from that. Also, now we can see how you cooperate each other for this project by taking initiatives in some areas. For further clarification of the trajectories in this training with the evidence, we would like to suggest you to mentioned "why" you think so. For example, you decided to focus on exploring students way of thinking. What was the reason for that decision making? If you can state such information additionally, this report will be self-explanatory evidence. We are looking forward to see your next report!

Objectives of the month

<ul style="list-style-type: none"> •To conceptualise the survey •To develop data collection instruments. •To trial test instruments developed for the survey

Objectives of the week

<ul style="list-style-type: none"> •To revise survey plan and budget based on collected feedback.
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Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon					
Tue		✓	Revising the draft budget and Instruments	Continued the following day	N/A
Wed		✓	Revising the draft budget and Instruments	Continued the following day	N/A
Thu		✓	Finalised revising the draft budget and Instruments and started revising the technical aspect of the survey	Budget and instruments revised. Work on technical part of the survey ongoing.	Revised budget and Instruments
Fri		✓	Revising the technical aspect of the survey plan	Draft revised technical part of the survey	To be finalised on Monday, 23 November

Comments/feedback given by colleagues

We have submitted the revised copy, we are yet to receive feedback.

研修実施者コメント

Nanae:
This is very nice you revisited your objectives of the month and revised it continuously.

Self evaluation for this week

Name	Comments
Tionge Saka	Week 3 was a busy week for me and I was not able to complete the task of revising the technical part of the survey plan. I hope to finalise work on it on 23rd November 2020.
Luke Eliya	In week 3, I had been very busy with official engagements. As such, I completed revising data collection instruments, and survey plan budget towards the end of that week. Nonetheless, I managed to complete that task within the week.

Team evaluation for this week

We have revised the survey plan and have submitted it for further comments. The budget has been heavily reduced because of the conditions provided. The revision may, however, affect the speed at which we wanted to have the task done.

Plan for next week

Further refine survey concept and data collection tools in view of the feedback given and trial test the data collection instruments
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Comments from the assistant

<p>Thank you very much for your continuous submission of weekly report. I guess you had a busy week with your official duty. However, revision of survey plan had been done as you scheduled and the contents and instruments developed by your team was progressing in terms of the quality. For example, the concrete example stated in the problem statements pointed out the risk when students stay at the level of counting all strategy. This kind of analytical point of view is very important for the identification of the problem I think. We would like to know how you were able to arrive this ideas and why you thought so. If you can reflect on the such improvement of your survey plan, this will also become a part of the evidence that you create in this training. We hope the trial data collection will be started soon!</p>
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Objectives of the month

•To conceptualise the survey
 •To develop data collection instruments.
 •To trial test instruments developed for the survey

Objectives of the week

•To further refine survey, budget and data collection instruments.
 •To arrange for trial testing with District Education Office and schools

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	Revising the technical aspect of the survey plan	Draft revised technical part of the survey	Revised technical part of the survey plan.
Tue					
Wed					
Thu		✓	Finalised revising the draft budget and based on comments from Hiroshima University Team	Budget and work plan for preliminary data collection revised.	Revised budget and work plan for preliminary data collection
Fri		✓	Visited District Education office and sought permission to carry out preliminary survey and the main survey in three schools in Zomba rural.	Permission granted	Permission from District office.

Comments/feedback given by colleagues

We were asked to put down the plan and budget for the preliminary data collection based on the template that we were provided with. This was done and submitted to Hiroshima University team.

Self evaluation for this week

Name	Comments
Tionge Saka	I was able to complete the planned assignment for the week though I was busy during the week. Looking forward to collecting data next week.
Luke Eliya	In spite of being engaged with official engagements, I managed to work on tasks planned for the week. This will prepare me to do pilot testing of the data collection instruments in Week 5 (next week).

Team evaluation for this week

We have revised the survey plan and have submitted it for further comments. The budget has been heavily reduced because of the conditions provided. The revision may, however, affect the speed at which we wanted to have the task done.

Plan for next week

Trial test the data collection instruments and conduct preliminary analysis

Comments from the assistant

Thank you very much for continuous contribution in the training. This week was the time for preparing and adjusting the plan, materials and so on in order to start the data collection. After successful completion of the data collection in the trial, I hope we can know your ideas like how do you perceive the appropriateness of the problem you identified in the survey plan, how did you find the effectiveness of the developed instruments. Based on your deep reflection on the trial testing, hopefully we can proceed for the main survey. I am looking forward to know the finding of the trial soon.

Objectives of the month

<ul style="list-style-type: none"> •Trial test instruments developed for the survey •Present results of preliminary survey. •Revise instruments based on the pre-liminary survey results

Objectives of the week

<ul style="list-style-type: none"> •To trial test data collection instruments on Standards 1 and 2 learners, and their mathematics teachers •To reflect on the preliminary survey experiences. •To enter data collected during the trial testing of instruments
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Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon					
Tue		✓	Purchased stationery and printed data collection instruments for use during trial testing.	Stationery was bought and data collection instruments were printed	Stationery and printed instruments
Wed	✓		Visited Domasi Demonstration Primary School in Zomba rural to conduct preliminary survey	Preliminary survey carried out on 8 Standard/Grade 2 learners/students (4 girls and 4 boys), and 1 mathematics teacher	Preliminary data collected
Thu	✓		Visited Domasi Demonstration Primary School in Zomba rural to conduct preliminary survey	Preliminary survey carried out on 8 Standard/Grade 1 learners/students (4 girls and 4 boys), and 1 mathematics teacher	Preliminary data collected
Fri		✓	Discussed preliminary survey experiences with Hiroshima Team, in readiness for Thursday, 10th December 2020 Zoom meeting		

Comments/feedback given by colleagues

<p>Yes. Insightful comments given by Hiroshima University Team (From Nanae)</p> <p>Thank you very much for finding the comments from us insightful. From my point of view also I found some ideas given from your team and Mr.Kusaka were very valuable for me. For example, we can write the example as the evidence of our professional learning. •Recorded data should be fully considered in terms of privacy of the students. (Dr.Saka) •Take covid-19 situatio into positive way, like this is the emergence of new way of working together with other countries people. (Mr.Luke) •Keep finding the connection between the research and curriculum revision. (From Mr. Kusaka) We had share a lot of important ideas so in order to keep exist these ideas, it is very nice to take a note of it in this traning.</p>
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Self evaluation for this week

Name	Comments
Tionge Saka	I have managed to achieve almost everything that was planned for this week. The keying in of data will however be finalised next week. (From Nanae) We appreciate that if you could also mention your effort on how you organize inputting the data. I think your way of organizing data is very systematic and it is indispensible to start the data analysis. For example, you can mentioned in the following way. "I have developed the format for inputting the data based on This format is useful in terms of.... (If you already found some idea for the improvement of the format for main survey, you can state it too)"
Luke Eliya	I was able to do all I planned for the week: carrying out preliminary survey, reflecting on preliminary survey experiences, and starting keying in data on excel which will be completed next week. (From Nanae) It is nice to know your plans that was carried out successfully. I would be grateful it I could know the contents of reflection on preliminary survey. For example, you said you have prepared some manipulative tools for the students to demonstrate their thinking. How did you come up with such good idea? Do you find any improvement for this idea? For example, you can provide the comments in the following way. "I noticed that using manipulative tools is necessary because And, for the next survey, it can be done by (some ways you think it is effective to find the answer of our research questions.)"

Team evaluation for this week

We have successfully carried out preliminary survey, reflected on the experiences on the activity, started entering data in exc

Plan for next week

Finalise entering data, analyse data and prepare a power point presentation of the preliminary survey for Thursday, 10th December 2020 midterm Zoom meeting.
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Comments from the assistant

<p>Thank you very much for sharing your progress in 5th week of this traninig. We proud that your team continuously making a lot of effort on the research collabotatively with Hiroshima Team. In order to deepen the reflection on what you have done in this week, please kindly show some example of your thought as the evidence of your professional learning. I am also learning a lot from you and I mentioned some example of my finding in the box of the comments from colleagues. Our thought is always appear and dissappear in a moments. What we found important also being transformed day by day. Therefore, I would like to recommend us to keep taking a note of it so that we can make deep reflection of the experiences in the training.</p>
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Objectives of the month

<ul style="list-style-type: none"> •Trial test instruments developed for the survey •Present results of preliminary survey. •Revise instruments based on the pre-liminary survey results

Objectives of the week

<ul style="list-style-type: none"> •To reflect on the preliminary survey experiences. •To enter data collected during the trial testing of instruments. •To analyse data collected during the trial testing of instruments. •To write a report of the data analysis, and prepare a power point for presentation. •To present preliminary findings during the 10 December meeting.
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Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	Entered data from preliminary survey on an excel template. Did preliminary reflections on data from preliminary survey.	Data entered on excel template. Documented reflections	Completed excel template.
Tue		✓	Analysed data from Grades 1 and 2 learners, and their respective grade mathematics teachers.	Prepared a write-up of analysis of results of preliminary survey	Write-up of analysis of results of preliminary survey
Wed		✓	Prepared a power point from a write-up of preliminary survey results for December 10, 2020 mid term online session	Power point of results of preliminary survey	Completed power point of results of preliminary survey
Thu		✓	Presented results of preliminary survey in an online meeting to HU-Team, and fellow course participants from Zambia. Watched and listened to presentations from HU-Team	Took comments and notes from presentations by HU-Team	Comments from HU-Team and notes documented
Fri					

Self evaluation for this week

SAKA Tionge Weddington	The week was a very productive one. Apart from achieving everthing that we planned to do, I learnt a lot from the online meeting we had on 10th December (especially from the presentation on methodology for curriculum text book analysis and methodology for lesson analysis). What I learnt is very relevant to my work as a researcher at a national curriculum level. The knowledge gained will be applied in my work. The reflection I had with my colleague further strengthened the call for the need to always carry out research in a professional manner. Without the trial testing, issues that were unearthed could have not been unearthed.
A: Knowledge and Skills	
ELIYA Luke	The week was very fruitful. I successfully accomplished all I had planned for the week. In addition, I benefitted a lot from the second mid term online session which was held on Wednesday, 10th December 2020, from discussions on presentations made by both the Malawi and the Zambian teams. I also learnt a lot from all presentations made by the HU-Team about the issue of reflection, theory on number and calculation, and methodologies for curriculum text book and lesson analyses. What I acquired is relevant as I prepare to carry out the main survey in January 2021. The knowledge acquired will also be helpful to my work as a curriculum specialist for mathematics as we review mathematics curricula, evaluate textbooks written by private publishers, observe lessons in schools and consequently come up with initiatives aimed at supporting curriculum implementation. All this has strengthened my professional growth and development.
A: Knowledge and Skills	

研修実施者コメント

Nanae:It seems like you have discussed on the knowledge domain in this reflection. If so, you can click and select one of the domains in the professional standard in order to focus on and deepen the reflection intensively.

Plan for the next week

To refine survey plan, and review data collection instruments based on experiences from preliminary survey and comments from HU-Team
--

Comments from the assistant

<p>Thank you for preparing for the meeting. I think it was very good that there was deep learning during the conference.I know that you have a high level of expertise, and I hope that you will share it with us as we continue to discover issues in reflection and implementation so that we can further develop it.(yoshitaka ABE)</p> <p>Thank you for sharing the progress of this week with us. Actually, we have very intentionally designed the contents of training in order to meet the intellectual needs of your team. Hopefully some ideas can be integrated into the revision of the survey plan and hopefully we can hear "what you integrated, how you integrated, and why you did so" in the next week's report.(Nanae)</p>

Objectives of the month

<ul style="list-style-type: none"> •Submit a final revised survey plan to HU-Team for their input •Visit Mchengawedi and Domasi Government primary schools to make arrangements for the main survey. <p>Collect data for the main survey from Mchengawedi and Domasi Government primary schools (2 visits to each primary school).</p> <ul style="list-style-type: none"> •Process and analyse data. •Analyse data and draft a report

Objectives of the week

<ul style="list-style-type: none"> •To finalise revision of the main survey plan based on comments from the HU-Team (through the 10th and 18th December Zoom meetings). •To make arrangements for the main survey with Mchengawedi and Domasi Government Primary schools. •To print data collection instruments, and assemble all materials and manipulatives in readiness for the main survey.
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Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon					
Tue		✓	Visited Mchengawedi and Domasi Government Primary schools to make prior arrangements for the main survey.	Main survey arrangements made	Assurance granted
Wed		✓	Assembled manipulatives to be used by students during the main survey	Manipulatives assembled	Availability of manipulatives
Thu		✓	Revising the survey plan in line with 10th and 18th December zoom meetings	In progress	In progress
Fri		✓	1. Assembled manipulatives to be used by students during the main survey 2.Revised survey plan inline with the 10th and 18th December meeting	1.Manipulatives assembled 2. Survey plan revised.	1. Availability of manipulatives. 2. Revised survey plan

Self evaluation for this week

SAKA Tionge Weddington	I worked together with my colleague on revising the survey plan and we successfully finalised it. This mainly involved incorporating comments made by HU team. We managed to make prior arrangements for the main survey data collection to be done in two schools in rural area by visiting the schools. This assisted in making sure that the targeted teachers are aware of our planned visit. The weeks activity also reinforced my team work skills.
C: Professionalism	
ELIYA Luke	I successfully finalised revising all data collection instruments and for the main survey due to start next week. Together with my partner (Dr Saka), I also managed to visit our target schools to make prior arrangement for the main survey. We also put in place all materials to be used during the survey: printing data collection instruments, purchasing manipulatives for the students. By doing all this, I grew a little more professionally as a curriculum specialist who should be a researcher at the same time.
C: Professionalism	

Plan for the next week

Buy lead pencils and pens for students and start conducting data collection exercise, starting with Mchengawedi Primary School
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Comments from the assistant

Thank you for sharing your progress. I found that you have collaboratively finalized the preparation for the main survey. It is obviously important to design the survey based on the review of previous studies and comments given by the colleagues, however it is also crucial to nicely adjust the plan with teachers, and prepare the things to be used in the survey. It sounds too practical things though for curriculum specialists, I think that professionals can also supervise even small things in detail and having good communications with teachers so that plan can be nicely carried out. I wish all the best for the field survey starting from tomorrow.

Objectives of the month

<ul style="list-style-type: none"> •Submit a final revised survey plan to HU-Team for their input •Visit Mchengawedi and Domasi Government primary schools to make arrangements for the main survey. •Collect data for the main survey from Mchengawedi and Domasi Government primary schools (2 visits to each primary school). •Process and analyse data. •Analyse data and draft a report

Objectives of the week

<ul style="list-style-type: none"> •To collect data from Standards 2 and 3 learners, and Standards 1 and 2 mathematics teachers at Mchengawedi and Domasi Primary schools for the main survey.

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	Double checked that all research materials (data collection instruments, pens, pencils, manipulatives, and researchers' notepads) are enough, and in place	All survey materials in good condition and order	Availability of all survey materials
Tue	✓		Visited Mchengawedi to collect data from 10 Standard 3 learners for main survey.	Main survey data collected from 10 Standard 3 learners. Data from Standard 2 mathematics teacher to be collected tomorrow. Standard 2 learners and their teachers had knocked off before we completed data collection from Standard 3	Completed learners' assessment and researchers' data collection tools.
Wed	✓		Visited Mchengawedi to collect data from 10 Standard 2 learners, 1 Standard 2, and 1 Standard 1 mathematics teachers for main survey.	Main survey data collected from 10 Standard 2 learners, and 2 mathematics teachers (1 Standard 2 and 1 Standard 1) as planned	Completed learners' assessment and researchers' data collection tools.
Thu	✓		Visited Domasi to collect data from 10 Standard 2 learners, and 1 Standard 1, and 1 Standard 2 mathematics teachers for main survey.	Main survey data collected from 10 Standard 2 learners, and 1 Standard 1 mathematics teacher	Completed learners' assessment and researchers' data collection tools.
Fri			None. Friday, 15 January every year is a public holiday in Malawi. As such, all schools and work places were on holiday.		

研修実施者コメント

Nanae:
I am looking forward to know what you found through data collection. Please kindly organize how you identify the student's strategies (this is highly related to research methodology). For example, data was recorded by this way, in this kind of procedure. In this way, we can ensure the credibility of the collected data.

Self evaluation for this week

SAKA Tionge Weddington	Successfully collected data from 30 learners (20 standard 2 and 10 standard 3). Did not finish collecting data from Domasi Government primary school because Friday, 15th January was a public holiday. We therefore respected the learners' and teachers right to rest on a public holiday such that no special arrangement was made to collect data on this day. The data collection exercise was full of learning as I was able to see the strategies learners use and I was able to see the gaps in the learners.
C: Professionalism	
ELIYA Luke	I successfully collected all data for main survey from Mchengawedi Primary School. I also collected all data from Standard 2 learners and 1 Standard 1 mathematics teacher at Domasi Government Primary School. I will collect data from Standard 3 learners and 1 Standard 2 mathematics teacher on Monday, 18 January 2021 (Friday 15 January was a public holiday in Malawi, hence no data collection exercise made on this day). The data collection exercise I carried out this week added a lot of value towards my professional development. In the course, I was able to reflect on what we have included in our primary mathematics curriculum for this level in relation to what learners were able to do versus what I thought learners would do at this level. All these experiences are important in the work of curricula reviews.
C: Professionalism	

Nanae:
I think it is very important to identify the gaps between reality of the students and the images in our perspective (or the curriculum). In order to overcome such gaps, I believe that evidence based curriculum development is crucial as you mentioned. I am sure that what you found through survey will be the substantial evidence for revision of the curriculum.

Plan for the next week

To finalise data collection exercise at Domasi government primary school. (Data to be collected from 10 Standard 3 learners, and 1 Standard 2 mathematics teacher from Domasi Government Primary School)
--

Comments from the assistant

Thank you very much for sharing the weekly report. As I commented above, the reason why this kind of survey is expected is, it provides us the reliable evidence for the development of the curriculum that is demanded by the student's in your country. I think it is very effective if the specialist of the curriculum development such as you, can clearly identify the evidence from the classroom. I hope you can keep take an initiative to get into the classroom and seeing and listening to the students and teachers, even after this course. (Nanae)

Objectives of the month

<ul style="list-style-type: none"> •Submit a final revised survey plan to HU-Team for their input •Visit Mchengawedi and Domasi Government primary schools to make arrangements for the main survey. •Collect data for the main survey from Mchengawedi and Domasi Government primary schools (2 visits to each primary school). •Process and analyse data. •Analyse data and draft a report

Objectives of the week

<ul style="list-style-type: none"> •To collect data from Standard 3 learners, and Standards 2 mathematics teachers at Domasi Primary schools for the main survey. •To enter main survey data on an excel template in readiness for preliminary data analysis.

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon					
Tue				Individual learners' work entered in excel template	Completed rows of excel template
Wed		✓	Entering data in an excel template	Individual learners' work entered in excel template	Completed rows of excel template
Thu		✓	Entering data in an excel template	Individual learners' work entered in excel template	Completed rows of excel template
Fri		✓	Entering data in an excel template	Individual learners' work entered in excel template	Completed rows of excel template

Self evaluation for this week

SAKA Tionge Weddington	Did not finalise collecting data because there was a declaration that learners in schools should be out of schools for 3 weeks. I was also involved in another activity the whole week. I therefore did not do much on the collected data. I hope to enter and analyse the data I collected starting from next week.
C: Professionalism	
ELIYA Luke	I stopped further data collection exercise from Domasi Demonstration Primary Schools. All schools were declared closed on Sunday, 17 January, 2021, due to the spread of Covid-19. As such, I resolved with my partner, Dr Saka, to work with the data we had collected from 30 learners, and 3 mathematics teachers. Data entry exercise on the excel template provided further opportunity for me to appreciate the kinds of thinking strategies the learners we assessed displayed. Such is useful from the perspective of curriculum development. So, I also grew professionally this week.
C: Professionalism	

Plan for the next week

To continue entering data in an excel template, and start analysis of data
--

Comments from the assistant

Thank you very much for sharing your status of this week. I understood your condition that school has been closed due to the spread of COVID-19 and data was reduced from what we planned before. However, as you mentioned, I also think data collected last week will certainly provide us the new insights. I am interested in what was found from the data collection and how you organized the data, so please kindly share with the excel file when you finish entering the data. I am most thankful that your continuous and active participation to this course despite your busy schedules.
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Objectives of the month

complete developing the survey problem. To complete developing data collection tools. To collect data.

Objectives of the week

draft the survey problem.develop the data collection tools.develop a survey plan.

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	identified the survey problem	draft survey problem	written survey objectives
Tue		✓	drafted the survey methodology	survey methodology steps	written survey steps
Wed		✓	drafted the data collection instruments	written data instruments	written data collection instruments
Thu		✓	drafted a survey plan	draft survey problem	draft survey plan
Fri		✓	drafted survey budget	draft survey budget	draft survey budget

研修実施者コメント

Nanae:
f you could specify the contents of draft it would be the concrete evidence

Nanae:
What kind of instrument did you obtain? Interview guide? It would be nice if you can specify your results.

Comments/feedback given by colleagues

we were able to work together through whatap group though at times communication was poor.

Name	Comments
shelly, justine. Nasilele and Agness	we were able to work on the assignment as a team though did not complete on ttime. .

Nanae:
We know you are very busy so you don't really have to worry about whether you complete on time or not. This is the part which you all can write your self-evaluation individually. You can check the "Format" tab and you can copy and paste that form from the next week in order

Team evaluation for this week

we all contributed towards the suvey plan. However,did not complete on time. Hope to improve and increase the speed in order to bit up the deadlines.

Nanae:
We can express more details about what kind of contribution had been made and what kind of improvement is expected for what kind of tasks.

Plan for next week

to continue to work on the survey plan and also on the data collection tools.

Comments from the assistant

Thank you very much for sharing your weekly report. This is the first challenges for online training though, we found that you have started your project with your team members. As you may know, this is the training which is putting more value on the "Evidence". In this regard, your description in the weekly report is also one of the part of evidence of your project as well as your professional development as an individuals and community. In order to show the evidences, we would like to suggest to describe little more concrete contents of what you have done. For example, Prof. Baba mentioned that content of discussions, contents of materials would be appreciated if it is shown here. We are looking forward to recieve your report in next week again.

Objectives of the week

Refine the statement of the problem which was submitted in week 1 to Jica Chugoku center Japan.

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	we were waiting to receive the feedback on the document which we submitted in week 1.	We received the feedback on our document from our supervisor in Japan.	Received commented survey plan.
Tue		✓	We looked at the comments which were made on the statement of the problem, objectives of the study and research questions.	We organised zoom meetings i.e local and one with our supervisor.	Organised zoom meetings both local and international.
Wed		✓	Held a local zoom meeting and	Reactions were made over the observations made by our supervisor.	Edited survey plan.
Thu		✓	we had a zoom meeting with our supervisor Kusaka Son for clarifications over some of the comments made on the document we had submitted.	A meeting was held and a lot of issues were ironed out.	New draft for preliminary survey
Fri		✓	We held a local zoom meeting during which the statement of the problem was refined and new objectives and research questions were formulated at local level.	A statement of the problem was refined. Waiting for further guidance.	Refined statement of the problem.

研修実施者コメント

Nanae:
Local zoom meetings were also held continuously. So good to know!
This kind of concrete descriptions really shows that evidence of the

Kusaka:
What kind of issues were revealed? You can show some examples.

Comments/feedback given by colleagues

Nanae:
You can mentioned some comments from other colleagues like kusaka san or your team members that you found it is important. So that your way of thinking will be visualized.

Self evaluation for this week

Name	Comments
Sikwale Shelly, Nasilele Sitwala, Phiri Agness, Phiri Justin	we were refining the statement of the problem which was submitted in week one as a team.

Nanae:
This is "SELF-Evaluation". We suggest you to externalize your awareness from each one of you.

Team evaluation for this week

After we had a zoom meeting with our counter parts in Japan on Thursday, as a team we had a local zoom meeting on Friday and refined the statement of the problem which will be forwarded to our supervisor in no time for further guidance before undertaking a survey.

Kusaka:
You can note that what statements was refined as the examples

Plan for next week

Receive guidance on the locally discussed statement of the problem. Conduct a pilot survey at one school each individually.

Comments from the assistant

Thank you very much for sharing the weekly report. Your continuous submission of the report will illustrate the each one of the evidences created in this training. Your description became much clearer compare to last week since you mentioned what you did in the activity. Further concretization of the evidence, we would like to suggest two things. 1) To state your own awareness based on the reflection on the activities in this week in the box of "SELF-evaluation". This will help you and other members to know thinking process explicitly. 2) To describe what you found as problem and issue from the discussion. We hope we can illustrate our pathway in this training here.

Objectives of the month

complete developing the survey problem. To complete developing data collection tools. To collect data.

Objectives of the week

Revising the budget for preliminary survey. Finalising the research problem and research objectives. come up with data collection tools.

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	Received comments for week 2 report. Responded to some of the observations made on the report.	We worked on some of the recommendations made on our week 2 report.	Received comments and week 3 report format
Tue		✓	Received comments made on the survey plan. studied the comments and the budget guidelines sent by Prof. Baba individually.	Looked at the budget guidelines and understood how the budget should be like.	Received comments on our survey plan.
Wed		✓	held our local zoom meeting and looked at the observations made on our documents and guidelines of the budget for the preliminary survey.	Asa group discussed the budget and comments on our document during our local zoom meeting.	REvised the budget locally following the given guidelines.
Thu		✓	Had zoom meeting with our counter parts from Japan and received more guidance on the survey and the budget.	Had a fruitful zoom meeting with our supervisors in Japan.	Held international zoom meeting.
Fri		✓	Compiling of a week3 report	Report was compiled	Week 3 report

Comments/feedback given by colleagues

研修実施者コメント

Nanae:
What did you find from the last meeting via zoom?
Was there any finding of new idea from Mr. Kusaka's comments?

Self evaluation for this week

Name	Comments
Sikwale Shelly	the preliminary survey plan was revised after receiving guidance on issues such as clearly stating of the problem and identified gap in the curriculum. The budgeting issues were also understood and revised.
Nasilele Sitwala	The discussions I had with my colleagues and the supervisors from Hiroshima University helped to polish up the preliminary survey plan and I am now ready to do the survey this coming week.
Phiri Agness	The zoom meetings amongst ourselves and with Hiroshima University were great and hope to go into field next to conduct our preliminary survey.
Phiri Justin	A week was very successful as I understood the type of budget to come up with for the preliminary survey and the task ahead of us for next week which is to carry out a survey in two groups one in Lusaka and another in Serenje.

Nanae:
Thank you very much for organizing the self-evaluation!
Now we can see what individuals think.

Team evaluation for this week

Nanae:
What kind of progress have you found as Zambia Team in this week?

Plan for next week

Nanae:
You can make list for the plan of the next week.

Comments from the assistant

Thank you very much for your continuous submission of the weekly plan. We can find that your team had successfully organized meetings with both domestic members and Hiroshima Team. I guess you have gained a lot of ideas from Mr. Kusaka and other team members from the meetings. If you remember what you found important, you can take some note and express in the box of the "comments/feedback given by colleagues". We hope all the best in the data collection for the preliminary survey. Please take some field note so that you can keep your ideas that noticed in the field. I hope we can see your some awareness from the field survey in the weekly report too.

Objectives of the month

complete developing the survey problem. To complete developing data collection tools. To collect data.

Objectives of the week

Both groups carry a preliminary survey on the identified problem of the meaning of multiplication and division at Grade 2 level in Chongwe and Serenje.

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	Recieved the recommendation to go ahead with our preliminary survey having successfully adjusted our budget to the required standard and revised the research problem.	We forwarded the revised budget to JICA offices in Zambia though they were on holiday.	Budget was sent to JICA offices.
Tue		✓	We had a discussion with JICA personel officers based in Zambia concerning the logistics for the two days of data collection i.e transport and half day daily allwoces.	It was agreed that Lusaka group a JICA vehicle was going to be provided while Justin in Serenje was advised to hire a vehicle for two days.	Agreement was made between JICA office and the four members of team Zambia.
Wed	✓		Both groups travelled to two different primary schools to make arrangements for lesson observations one in Chongwe by the Lusaka group and one in Serenje by Justin.	Lusaka group managed to arrange for a lesson observation on multiplication on Thursday while Justin' sobervation was scheduled for Friday on division.	Both groups visited the schools and successfully made arrangements.
Thu	✓		Lusaka group travelled to Chongwe and observed a lesson successfully as planned.	Lesson was observed in Chongwe on multiplication by the Lusaka group.	Lesson was observed.
Fri	✓		Justin visited Handbar Kapotwe Primary School and observed a lesson as arranged.	Lesson was observed in Serenje on division by the Justin.	Lesson was observed.

Comments/feedback given by colleagues

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Self evaluation for this week

Name	Comments
Sikwale Shelly	The week ended on the good note because I managed to carry out the preliminary survey.
Nasilele Sitwala	The lesson observation was successful and of great help in the data collection for the research.
Phiri Agness	The preliminary survey of data collection to the main survey was conducted at one of the peri-urban schools in Chongwe district. And so far the data collected was in conformity with our plan.
Phiri Justin	I successfully made arrangements for a leson observation and document analysis. I observed the lesson on the meaning of division as scheduled on Friday at Handbar Kapotwe Primary School in Serenje District.

Team evaluation for this week

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Plan for next week

From Nanae

Since you have already collected data, you can start thinking of the detail schedule of data analysis till the day of the mid-term presentation. For example,

- 1) Moday to Wednesday: Inputting the data
- 2) Thursday to Friday: Data analysis
- 3) After seeing the results of the analysis, consult with Mr.Kusaka before the mid-term presentation on December 10th (Thu).

Comments from the assistant

From Nanae

I am happy to hear that you were able to visit the school and having the lesson observation. Thank you so much for sharing the photos of data collection. How did you find the lesson which you observed in the school? Was there any gap between your prediction and reality, or no gap between them? What kind of finding did you see in the lesson? Although it is before the data analysis, if you can take a blief note of the your awareness, it would be helpful when you start interpret the analyzed data. If you can discuss such point with your team members, you can mentioned the contents of the disucussion in the box of "comments/feedback given by colleagues".

Objectives of the month

Finish analysing and compiling data collected from the preliminary survey.

Objectives of the week

Data analysis and compilation from the preliminary survey.

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	Merging of data collected from Chongwe and Serenje.	Merged data.	Merged data.
Tue		✓	Analysing of data collected begins.	Partly analysed data.	Ongoing analysis.
Wed		✓	Data analysis continued...	Analysed data	Data analysis continued.
Thu		✓	Compilation of analysed data.	partly compiled data.	compiled data
Fri		✓	Compiling of data collected completed.	Compilation of data collected completed.	Preliminary survey results ready.

Comments/feedback given by colleagues

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Self evaluation for this week

Name	Comments
Sikwale Shelly	Participated in the analysis and compilation of data collected from preliminary survey. It was interesting to learn how to come up with themes for the main research.
Nasilele Sitwala	Managed to analyze and compile data collected as expected. Looking forward to the main survey.
Phiri Agness	Did analysis and compilation of data collected.
Phiri Justin	Have been studying and analysing data.

Team evaluation for this week

Successfully analysed and compiled data from the preliminary survey.

Plan for next week

prepare and present survey results during the zoom meeting.

Comments from the assistant

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Objectives of the month

complete developing the survey problem. To complete developing data collection tools. To collect data.

Objectives of the week

Analyse the data collected during the preliminary survey through lesson observation and document analysis. compile a report to present during the second session meeting to held on 10 -12 - 2020.

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	Continued analysing the data collected during the mini survey and compiling of the report based on the collected data in readiness for presentation on 10 - 12- 2020.	Looked at the collected data and report writing continued.	Report writing continued.
Tue		✓	Continued analysing the data collected during the mini survey and compiling of the report based on the collected data in readiness for presentation on 10 - 12- 2020.	Looked at the collected data critically and report writing continued.	Report writing continued.
Wed		✓	The report for the preliminary survey was shared amongst the members of the Zambian team for observations before the presentation was made.	The team looked at the document and agreed that it should presented as it was compiled.	Each member received the report for mini survey.
Thu		✓	We had our second session presentation on the data collected during the preliminary survey via zoom though the network was a let down to our side, but thanks to the Japanese people who were really patient with the situation.	Had a fruitful zoom meeting with our supervisors in Japan encouraged us to proceed on with the main survey.	Held international zoom meeting.
Fri		✓	Compiling of a week 6 report and reflecting on issues that arose during the meeting.	Report was being compiled whilst debating on which format to use until Monday we agreed on the format and when the new one should come into effect.	The format to be used was agreed upon.

Comments/feedback given by colleagues

Self evaluation for this week

Name	Comments
Sikwale Shelly	The preliminary survey report was written and analysed before it was presented during the mid term session though with network challenges. Also benefited a lot during the session and encouraged to proceed with our main survey plan.
Nasilele Sitwala	I learnt a lot during the process of data analysis and report writing for the mini survey. In addition to that, I was also reminded about the goals of our survey during reflections of the last meeting such use of suitable tools for our survey.
Phiri Agness	Despite the network being pathetic on 10/12/2020, the zoom meeting we had was really of benefits in relation to the gaps that are there between the textbook and the curriculum.
Phiri Justin	A week was very successful as I am able to see the challenges with the methodology used in content presentation compared to other nations like Japan as it was beamed. Though network was a let down, the plans of the week were still attained.

Team evaluation for this week

Plan for next week

Comments from the assistant

Thank you very much for sharing your report. We were able to know how you perceived the last session. From your presentation, we could also know that the methodologies introduced in the textbook strongly influence the actual lessons. Therefore, the description in the curriculum should clearly state what students learn so that textbook will be developed nicely. You have mentioned that the meaning of the operations is very important in this sense, so I think what Prof. Baba mentioned regarding the multiplicative relations are very informative in order to deepen understanding for the meaning of operation. In this way, if you found something useful for you in the session, please let us know what you found, how you can utilize it, and why you felt it is important or useful for you so that Hiroshima team also can improve how to organize this training. Your active participations are highly appreciated. (Nanae)

Objectives of the month

To polish up the preliminary survey document which was presented during zoom meeting on the 10th December, 2020 to the level of the main survey. (i.e objectives, background, methodologies and instruments).

Objectives of the week

To look at the sample size and background for the main survey to be conducted next year (2021). To come up with the budget suitable for the main survey.

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	We were looking at the background of the main survey to be conducted next year January to February.	We agreed to think about how the background should look like.	As individuals we continued looking at the background.
Tue		✓	We continued discussing the background for the main survey through whatsapp to be conducted next year January to February.	We agreed on how the background should look like.	proposed background for the research.
Wed		✓	We were looking at methodologies and instruments to be used when collecting data for the main survey.	We agreed that each member to observe 2 lessons i.e one on multiplication and 1 on division.	Number of lessons to observe agreed.
Thu		✓	conducted zoom meeting locally to discuss the budget for the main survey	We didn't reach a conclusion because we were not sure of the population size.	A request was sent to Kusaka San who guided us on the same.
Fri					

Self evaluation for this week

Sikwale Shelly	I managed to contribute positively towards the formulation of the research background for the main survey and even enquired from Kusaka San on whether to increase the population size for the main survey or not.
B: Process of plan and	
Nasilele Sitwala	I had a successful week we managed to come up with the background and objectives of the main survey though we didn't conclude on the budget.
Phiri Agness	This week was a successful as most of the things we planned to look at in relation to polishing up our preliminary survey were achieved.
Phiri Justin	I had a progressive week week as made positive contributions towards polishing up the research methodologies and instruments for the main survey.

研修実施者コメント

Nanae:
You can select one of the domains if you like.

Plan for the next week

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Comments from the assistant

New year's greetings from Hiroshima Team! Your report shows that your team worked for polishing up the main survey plan. You have mentioned that background of the research, methodologies, and instruments were considered in this week. We are looking forward to see how you come up with one ideas and why you made up the decision in that way. When we have a chance to exchange the ideas, please share your ideas with us! You can also mentioned some examples of the above points in the box of self-reflection by selecting some domain of the professional standards.

Objectives of the month

To complete developing data collection tools. To collect data for the main survey from two primary schools one in Lusaka and the other one in Serenje.

Objectives of the week

To collect data from two different primary schools to be used for the main survey.

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon					
Tue		✓	The two groups discussed on which topics to observe a lesson.	Agreed on the topics on which to observe the lessons.	Topics settled for lesson observation.
Wed		✓	Printing out data collection tools	The tools were printed out in readiness.	Data collection tools.
Thu		✓	Two groups one in Lusaka and the other one in Serenje visited one school each to make arrangements for lesson observations.	Both teams successfully arranged for lesson observations.	Headteachers agreed to the idea of lesson observation
Fri		✓	Both groups successfully observed the lessons on multiplication.	Lessons were observed and teachers were interviewed as planned.	Pictures of lesson plans and parts of the textbooks.

Comments/feedback given by colleagues

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Self evaluation for this week

Name	Comments
Sikwale Shelly	The week was very fruitful as I was able to make the arrangement with school management and carry out a lesson observation for the data to be used in the main survey.
Nasilele Sitwala	I was very happy that I fully participated in the lesson observation and data collection purposefully to be used in the final report.
Phiri Agness	I am very pleased to have been actively involved in lesson observation and data collection process for the main survey.
Phiri Justin	A week was very successful as I was able to arrange for a lesson observation on multiplication with senior teacher at Kamwala Primary School and have an interview with her concerning the presentation of the content in the textbooks and by teachers.

Team evaluation for this week

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Plan for next week

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Comments from the assistant

Thank you very much for sharing the weekly report. It is good to know how you were actually organized and conducted main survey. It's also very nice to know you were finally able to visit two schools and collected data through lesson observation and interviews despite of difficulties under covid-19. I am interested in what was found from main survey in addition to the finding of preliminary survey. We are looking forward to hear your ideas in the final presentation on 18th February. Your continuous and autonomous participation to the training is always appreciated.

国名: エチオピア

報告期間: 2020年11月2日～11月6日

提出回数: 1

Objectives of the month

Discussion with colleagues ,Scheduling for tasks,Producing proposal

Objectives of the week

Discussion and Scheduling

Activities of the week

	Survey	Activity	What you did	Results/Achievement	Evidence
Mon		✓	I discussed with colleagues on the activities		
Tue		✓	I read the whole plan of the training		
Wed		✓	I searched for materials useful for producing materials		
Thu					
Fri					

Comments/feedback given by colleagues

Colleagues agreed on the points

Self evaluation for this week

Name	Comments
Abiy Kefyalew	I need to work on fast

Team evaluation for this week

Plan for next week

I have a plan to produce a proposal that show the problem and a strategy used to conduct a mini study

Comments from the assistant

添付資料4:メーリングリスト記録

No.	日時	国(所属)	ML本文
1	10/26	研修実施者	<p>Subject: [JICA-Maths:1] Opened a mailing list for JICA training</p> <p>Dear all,</p> <p>Thank you very much for your reply and acceptance to join the mailing list.</p> <p>I would like to inform you are registered in the mailing list "*****@ml.hiroshima-u.ac.jp".</p> <p>We have made this mailing list as one of our communication tools for the JICA-HU Training "Mathematics Curriculum Development at Primary Level".</p> <p>We will explain you about the details of communication tools at the first session on October 29.</p> <p>Members of this mailing list is as below.</p> <p>a. 10 participants for this training from 3 countries</p> <p>b. Prof.Baba of Hiroshima University</p> <p>c. 5 members of Hiroshima University</p> <p>Mr.Kusaka, Ms.Yasukawa, Ms.Oka, Ms.Minagoshi and me/Furukawa(ms.)</p> <p>I will send an invitation of Zoom meeting on October 29 by this mailing list soon.</p> <p>Best regards,</p> <p>N.Furukawa Hiroshima University</p>
2	10/26	研修実施者	<p>Subject: [JICA-Maths:2] Invitation for Zoom meeting of JICA Training on October 29</p> <p>Dear all,</p> <p>We would like to inform you the Zoom meeting URL for the 1st session of JICA training on October 29, 2020.</p> <p>Topic: Mathematics Curriculum Development at Primary Level 2020</p> <p>Date: October 29, 2020</p> <p>Time: 8:00am (Zambia and Malawi)</p> <p>9:00am (Ethiopia)</p> <p>3:00pm (Japan)</p> <p>Zoom Meeting URL:</p> <p>I look forward to seeing you soon.</p> <p>Best regards,</p> <p>N.Furukawa Hiroshima University</p>
3	10/26	エチオピア	Subject: [JICA-Maths:3] well noticed.
4	10/26	エチオピア	Subject: [JICA-Maths:4] Thanks for registration.
5	10/26	ザンビア	Subject: [JICA-Maths:5] Thank you very much i have received
6	10/26	ザンビア	Subject: [JICA-Maths:6] Thank you. Good morning
7	10/26	マラウイ	Subject: [JICA-Maths:7] Dear Furukawa Well noted Sir.f.f.Thank you very much.
8	10/26	マラウイ	Subject: [JICA-Maths:8] Dear Furukawa,Noted with thanks.Kind regards.Luke Eliya
9	10/26	マラウイ	Subject: [JICA-Maths:9] Dear Ms Furukawa,Noted with thanks.Best regards,Tionge
10	10/26	マラウイ	Subject: [JICA-Maths:10] Dear Ms Furukawa,Thank you.Best regards,Tionged.
11	10/26	ザンビア	Subject: [JICA-Maths:11] Thank you. Nasilele
12	10/26	ザンビア	Subject: [JICA-Maths:12] Dear Furukawa,Noted very well. Thanks a lot. Justin
13	10/26	ザンビア	Subject: [JICA-Maths:13] Noted with thanks Munkonge
14	10/26	エチオピア	Subject: [JICA-Maths:14] Thank you! Matebie
15	10/26	エチオピア	Subject: [JICA-Maths:15] Thank you! Matebie
16	10/26	エチオピア	Subject: [JICA-Maths:16] Thank you! Abiy
17	10/28	研修実施者	<p>Subject: [JICA-Maths:17]</p> <p>Dear all,</p> <p>I would like to send a reminder message to you.</p> <p>You can find URL for zoom meeting as below.</p> <p>If you have any problems to access zoom meeting please let me know it by email.</p> <p>I am checking emails at the beginning and during the session as well.</p> <p>See you tomorrow.</p> <p>Best retards,</p> <p>N. Furukawa</p>
18	10/28	ザンビア	Subject: [JICA-Maths:18] Thank you. Regards Shelly
19	10/29	マラウイ	Subject: [JICA-Maths:19] Dear N. Furukawa,Thank you for your reminder of the meeting, and also sending a link.Kind regards Luke Eliya

No.	日時	国(所属)	ML本文
20	10/29	研修実施者	Subject: [JICA-Maths:20] Dear all, I am sending today's texts and documents as attached. I hope you will find these documents before today's session. See you soon. Best regards, N.Furukawa/Hiroshima University
21	10/29	研修実施者	Subject: [JICA-Maths:21] Dear all, Please find the attached documents, "Today's program". I have sent 6 texts for today's session by the previous e-mail (ML#20). Best regards, N.Furukawa
22	10/29	ザンビア	Subject: [JICA-Maths:22] Thank you very much . Good morning. Shelly
23	10/29	研修実施者	Subject: [JICA-Maths:23] Dear all, Thank you for your participation today's session. I am Ayumi Oka, graduate student of Hiroshima University. I am sharing how to use three communication tools. Always we use "Mailing list" to contact each other. If even you want to contact the country representative, please send to this address, not to contact the individual address. Using this address can be helpful to share opinions and discussions whole taining member. The "JICA Online Training 2020" on Facebook is used by training members only. Hopefully, all of us can join this group. Please visit link below and request to join. The "Dropbox" is just checking and downloading training materials and submitted materials, viewing of comments. When commenting on Dropbox, you need to enter your email address and password registered. If you don't have account, please create personal Dropbox account by yourself. It is needed to comment. Please visit the link. And you can find today's documents. Please keep using on the website. It is might be carry huge information 5G or more. If you download this application and use local storage, your personal computer fall into shortage of storage. Please keep using on the web-site, web-browser as well. Best regards, Ayumi OKA (Ms.)
24	10/29	マラウイ	Subject: [JICA-Maths:24] Well noted Ayumi. Thank you. Luke
25	10/29	エチオピア	Subject: [JICA-Maths:25] Noted with thanks Ayumi. Best Regards Zafu Abraha
26	10/29	エチオピア	Subject: [JICA-Maths:26] Well Received. Thank you! Matebie Alemayehu
27	10/30	研修実施者	Subject: [JICA-Maths:27] Dear all, Did you visit FB "JICA Online Training 2020"? I posted photos of yesterday's zoom meeting on Facebook. I am happy if you will post any comment. Best regards, N.Furukawa
28	10/30	ザンビア	Subject: [JICA-Maths:28] Thanks we will visit. Good morning.
29	10/30	マラウイ	Subject: [JICA-Maths:29] Dear Ayumi, Thank you for the information.
30	10/30	ザンビア	Subject: [JICA-Maths:30] Thanks a lot for the information.
31	11/4	研修実施者	Subject: [JICA-Maths:31] Dear all members, Good morning. It's Kusaka. Thank you very much for joining our training last Thursday. Have you discussed the survey plan within your team after the training? If you have discussed something, please share with us. Even only the part of identification of the problem is fine. Through the discussion with us, we would like to deepen and finalize your survey plan including the strategies and schedules (tools, target, necessary amount of days etc.) Once we finalized the plan, we will discuss the necessary cost to the JICA office in each country, so please do not yet ask about it to your country's JICA office. We are waiting to see and discuss your plan. Thank you very much. Regards, Satoshi Kusaka

No.	日時	国(所属)	ML本文
32	11/4	マラウイ	Subject: [JICA-Maths:32] Dear Kusaka, This is noted. Malawi team met and discussed. We are putting together what we discussed and we will share with you by the end of this week. Best regards, Tionge
33	11/5	ザンビア	Subject: [JICA-Maths:33] Thank you. From zambia we have started working on something and we wil foward it to you over the weekend. Shelly
34	11/7	研修実施者	Subject: [JICA-Maths:34] Dear Tionge and Luke (Team Malawi) Thank you very much for sharing your survey plan. You are the first country to submit! I'm forwarding your plan to everybody in our community, so that other members (Ethiopia and Zambia) can also check and give comment on the plan. When you give comment on the plan, please include this e-mail address. We, Hiroshima university team will also check and feedback to you soon. Thanks again for submitting the plan Regards, Satoshi Kusaka
35	11/7	研修実施者	Subject: [JICA-Maths:35] Dear Mr.Tionge and Mr.Luke (Team Malawi) (Mr. Kusaka) Greeting from Japan. I'm Nanae Yasukawa from Japan. Thank you very much for sharing your survey plan, Team Malawi! I'm very impressed with your prompt action for starting the activity. I am very glad to start consideration on your survey plan with Hiroshima Team. Hopefully, we can give concrete feedback soon, let say sometime very beginning of the next week. By the way, have you done with making the weekly report of this week? If your team already have done with summarizing it, please kindly share your weekly report also. Description of weekly report may help us to understand your intention and future view for the development of the survey plan more clearly. If other team like Zambia and Ethiopia also have done with weekly report, we would be most grateful if you could share it by attaching on email to the address below. Have a nice weekend. Again, thank you for sharing your ideas! Nanae Yasukawa
36	11/7	マラウイ	Subject: [JICA-Maths:36] Dear Nanae Greetings from Malawi! Please find, attached, Team Malawi's Week 1 report. Team Malawi would also like to request, through you, a link to which we should be sharing these reports. We cannot locate this link or else should we be sending through Mr Satoshi Kusaka (as we have done with our draft concept note)? Thank you. Luke
37	11/7	マラウイ	Subject: [JICA-Maths:37] You are welcome. Thank you. Luke
38	11/7	ザンビア	Subject: [JICA-Maths:38] Good morning thank you.We are working on the assignment this weekend. The problem we faced was that i was working out of town in the remote area where there is no network .i came back yesterday and we are doing something with my team which we can send by the end of the day. thank you. Shelly
39	11/7	研修実施者	Subject: [JICA-Maths:39] Dear Ms. Sikwale Shelly, Thank you very much for sharing the information. We are looking forward to seeing your survey plan. Regards,Satoshi Kusaka
40	11/7	ザンビア	Subject: [JICA-Maths:40] Still trying to polish up the problem. Justin

No.	日時	国(所属)	ML本文
41	11/7	研修実施者	<p>Subject: [JICA-Maths:41] Re: MALAWI TEAM'S WEEK 1 REPORT Dear Mr.Luke Thank you very much for your quick response, Mr. Luke. In addition to that, we deeply appreciate sharing of the Malawi team's weekly report! We will check your description there and we will share it with comment from us. In terms of the submitting and sharing, you don't really have to worry about that. When you finished to create weekly report or other material related to survey, please send them to this email address (*****@ml.hiroshima-u.ac.jp), not necessarily individual person's email address. Once you send the email to above address, your materials and your messages are directly shared among the all the members (Malawi, Zambia and Ethiopia) of this training as well as the members in Japan. Besides, once you submit materials, Ms. Oka is uploading and organizing them on Dropbox in the link below. Just please kindly remember, your way of communication with us is so far very excellent. If you have any questions, please let us know. Again, your active participation and contributions are highly appreciated. Sincerely, Nanae Yasukawa</p>
42	11/7	マラウイ	Subject: [JICA-Maths:42] Well noted Nanae. Thank you very much. Luke
43	11/9	ザンビア	Subject: [JICA-Maths:43] Good evening i have forwarded the survey plan. for Zambia. Thank you. Shelly
44	11/9	ザンビア	Subject: [JICA-Maths:44] i have forwarded a survey plan for Zambia. Shelly
45	11/9	ザンビア	Subject: [JICA-Maths:45] i have forwarded the weekly report for Zambia. Regards Shelly
46	11/9	研修実施者	<p>Subject: [JICA-Maths:46] Dear Zambian team, Thank you very much for sharing the survey plan. We will check and give feedback to you soon. Everybody can also comment on it. Regards, Satoshi Kusaka</p>
47	11/9	研修実施者	<p>Subject: [JICA-Maths:47] Re: weekly report for Zambia Dear Shelly-san Good morning from Japan. Thank you very much for sharing a weekly report from the Zambia team. After adding some comments on that, we will share with you all again. Have a nice day. Sincerely, Nanae Yasukawa</p>
48	11/9	研修実施者	<p>Subject: [JICA-Maths:48] Dear Mr. Tionge and Mr. Luke Good day from Japan. I hope you had a good weekend. I would like to share the comments for your survey plan. The Hiroshima Team with Prof. Baba has discussed your submitted plan and we commented on your file. please kindly find the attached file of this email. In order to clarify some important points, we would like to hold an online meeting via zoom with the Malawi team, if you don't mind. Could you please tell me the available time for both of you? Sometimes the early part of this week would be nice for proceeding the project. Thank you for your active participation. Sincerely, Nanae Yasukawa</p>
49	11/9	ザンビア	Subject: [JICA-Maths:49] Good morning thank you. Shelly
50	11/9	ザンビア	Subject: [JICA-Maths:50] Good morning. Shelly

No.	日時	国(所属)	ML本文
51	11/9	研修実施者	<p>Subject: [JICA-Maths:51] Comments of weekly report for W1 【Zambia&Malawi】</p> <p>Dear Team Zambia and Team Malawi</p> <p>Thank you very much for your sharing of the weekly report.</p> <p>We knew that our training is now moving forward day by day.</p> <p>Please kindly find the attached files to see the comments on your weekly report for Team Zambia and Team Malawi.</p> <p>In order to enhance the visualization of the evidence, we would appreciate it if you could obtain little more details of the contents of what you have done.</p> <p>If you have any questions regarding the weekly report, please feel free to contact us.</p> <p>In terms of the submission of the weekly report of Week 2, you can copy the "format tab" to write addindly in the same file.</p> <p>We are looking forward to hearing from you about the weekly report on this Friday again.</p> <p>Of course, if the Ethiopia Team also has made it, your submission is also most welcome anytime.</p> <p>Have a nice day.</p> <p>Sincerely, Nanae Yasukawa</p>
52	11/9	ザンビア	<p>Subject: [JICA-Maths:52]</p> <p>Thank you for acknowledging that you have received the Zambian weekly report. sorry for stating the evidence of what was done without showing it. we thought since the survey draft plan has everything then it would help</p> <p>Thank you for reminding us next time, we will learn to work towards that. thank you. Shelly</p>
53	11/9	マラウイ	<p>Subject: [JICA-Maths:53]</p> <p>Dear Nanae</p> <p>Thank you very much for the feedback on our survey plan. Let me discuss with Dr Saka (my colleague) on the date and time. We shall get back to you soon.</p> <p>Kind regards. Luke</p>
54	11/9	マラウイ	<p>Subject: [JICA-Maths:54]</p> <p>Dear Nanae</p> <p>Thank you very much for the feedback on our weekly report. Please allow us to go over the comments. We will surely consult you if need be.</p> <p>Kind regards. Luke</p>
55	11/10	研修実施者	<p>Subject: [JICA-Maths:55]</p> <p>Dear Mr. Luke</p> <p>Thank you very much for your prompt reply.</p> <p>Please let us know whenever appropriate for you and Dr. Saka.</p> <p>Your kind cooperation is highly appreciated.</p> <p>Sincerely, Nanae Yasukawa</p>
56	11/10	研修実施者	<p>Subject: [JICA-Maths:56]</p> <p>Dear Shelly and Zambian members,</p> <p>Thank you very much for sharing your survey plan.</p> <p>It is very good to deal with the use of textbook focusing on the evaluation of teaching and learning.</p> <p>Generally, it would become much better if you identify the problems focusing of the gap between the description in curriculum and how they are shown in the textbooks.</p> <p>I gave some comment on the attached file.</p> <p>We would like to hold an online meeting via zoom with the Zambian team to discuss and clarify the important point, survey schedule, budget and so on.</p> <p>Could you please tell me the available time?</p> <p>Thank you very much.</p> <p>Best regards, Satoshi Kusaka</p>
57	11/10	ザンビア	<p>Subject: [JICA-Maths:57] Thank you we will inform you after we have discussed. May be Thursday or friday. thank you once more. Shelly</p>
58	11/10	ザンビア	<p>Subject: [JICA-Maths:58] I suggest thursday 12.11.2020,09:00hrs (cat) for the zoom meeting. Thank you. Kind regards. Nasilele</p>
59	11/10	ザンビア	<p>Subject: [JICA-Maths:59] Thank you. for the document. i have downloaded it and we will discuss with the group and improve it and send it back by tomorrow. Thank you. Shelly</p>
60	11/10	ザンビア	<p>Subject: [JICA-Maths:60] online zoom meeting is possible on Thursday 12-11 2020 at 09 am Zambian time. thank you. Shelly</p>

No.	日時	国(所属)	ML本文
61	11/10	マラウイ	<p>Subject: [JICA-Maths:61] Dear Nanae I, with my partner, Dr Saka, have analysed each of your nice comments. For some comments, we will just work on them. For others, we truly need to discuss with you dear colleagues. We are very sorry we have been engaged with official duties on Monday and Tuesday. Every Wednesday, we have meetings with DFID on a mathematics project they are funding. So, we will also be both are engaged. Is it possible we hold the meeting with you on Thursday or Friday from 7:30am (Malawi time) or any time that will be convenient for you (on Thursday or Friday) this week? Thank you. Luke</p>
62	11/11	ザンビア	<p>Subject: [JICA-Maths:62] I think Thursday 12/11/2020 @09hours is ok. Munkonge</p>
63	11/11	研修実施者	<p>Subject: [JICA-Maths:63] Zoom meeting for reviewing survey plan (Nov.12) 【Malawi/Zambia】 Dear Team Malawi, Team Zambia (Mr.Kusaka, Ms.Oka) Good day from Japan. Thank you very much for your quick reply for the adjusting your schedule for the meeting. As you suggested, we would like to have the meeting for reviewing your survey plan at the following date and time. •Team Malawi November 12th, Thursday 7:30 am (Malawi time), 2:30 pm (Japanese time) •Team Zambia November 12th, Thursday 9:00 am (Zambia time), 4:00 pm (Japanese time) Please kindly join the meeting URL below. We are going to use zoom application same as before. As you know, if people join the zoom meeting physically at the same place without making mute both your laptop and microphone, unpleasant sounds would be spread around. Therefore, I suggest you to connect only one laptop to zoom meeting, if the several team members will join it at the same place physically. (If it is not the same place, you don't really have to worry about that.) Since we all are going to gather remotely, please contact us by email in case you will not be able to attend the meeting due to some problem such as network connectivity and so on. Please feel free to ask me if you have any question regarding this. Thank you very much for your cooperation. Sincerely, Nanae Yasukawa</p>
64	11/11	マラウイ	<p>Subject: [JICA-Maths:64] This is noted Nanae. Thank you. Will join the meeting. Tionge</p>
65	11/11	マラウイ	<p>Subject: [JICA-Maths:65] Well noted. Will join the meeting. Thank you very much. Luke</p>
66	11/11	ザンビア	<p>Subject: [JICA-Maths:66] Good morning. Thank you very much we have taken note of. Shelly</p>
67	11/12	研修実施者	<p>Subject: [JICA-Maths:67] Dear Abiy and Ethiopian team Thank you very much for submitting weekly report. Please use attached file for weekly report from this week. It is good you had some discussion about survey plan within your team. Please continue the discussion, and once you made a plan please share with us. Regards, Satoshi Kusaka</p>
68	11/12	ザンビア	<p>Subject: [JICA-Maths:68] Noted with thanks. Munkonge</p>
69	11/16	マラウイ	<p>Subject: [JICA-Maths:69] Dear Nanae, Find attached a report on what we (Malawi team) did last week. Best regards, Tionge For Malawi Team</p>
70	11/16	研修実施者	<p>Subject: [JICA-Maths:70] Dear Abiy and Ethiopian team Thank you very much for sharing the survey plan! I'll share it to everybody. Is it possible to send Word version so that everybody can comment on it. I'll give feedback to you soon. Regards, Satoshi Kusaka</p>

No.	日時	国(所属)	ML本文
71	11/16	研修実施者	Subject: [JICA-Maths:71] Dear Justin and Zambian team Thank you very much for sending the weekly report. I'm just sharing it to all the members. Regards, Satoshi Kusaka
72	11/16	研修実施者	Subject: [JICA-Maths:72] Dear Dr. Saka and Mr.Luku, Malawi team Mr. Phiri and Zambia Team Greetings from Japan. I hope you had a very nice weekend. Thank you very much for sharing your weekly report with us. We are going to read your ideas and we will send you back the files with comments soon. At the first glance through, you had many activities last week and it can be seen from your detailed description of the activities. Your proactive participation is highly appreciated. Have a nice day. Nanae Yasukawa
73	11/16	エチオピア	Subject: [JICA-Maths:73] Here is the word document. Abiy
74	11/16	研修実施者	Subject: [JICA-Maths:74] Thank you very much for sharing the weekly report. Please kindly see the attached files to check the comments from the Japan team. Descriptions became clearer in terms of the activities that you engaged. For further externalization of the thinking process in this training more explicitly, we would like to suggest you two things. 1) To mentioned examples of the finding from the activity. 2) To mentioned the reason why you reach the ideas that you found through activities. Both Zambia and Malawi team report are very informative for each other so we also recommend to observe how others make the report. For Zambia team and Ethiopia team, please used the attached file for the next submission since you have four members in your team. I wrote everyone's name in the box of self-evaluation already. Please feel free to contact us anytime regarding the weekly report too. Your active participations are strongly appreciated . Have a nice day! Sincerely, Nanae Yasukawa
75	11/16	マラウイ	Subject: [JICA-Maths:75] Dear Nanae, Thank you so much for the feedback on week 2 report. Best regards, Tionge
76	11/16	研修実施者	Subject: [JICA-Maths:76] Re: FW: Ethiopia Team_Study proposal Dear Abiy and Ethiopian team Thank you very much for sharing the survey plan. Your focus (Addition and subtraction in grade 2 and 3) is very interesting and important! But, I think it is better the focus would be more specific. Have you already known any challenges or problems from previous researches or from your professional experiences? Can you make any hypothesis about what kind of problems students face in addition and subtraction? If so, the research question and survey tools will be more specific. Can we have small zoom meeting sometime in this week to clarify the above things and survey schedules? Thank you very much! Satoshi Kusaka
77	11/16	研修実施者	Subject: [JICA-Maths:77] Sorry I forgot to attach the document. Satoshi Kusaka
78	11/17	ザンビア	Subject: [JICA-Maths:78] Good morning i have forwarded the draft survey plan for your attention. Shelly
79	11/17	研修実施者	Subject: [JICA-Maths:79] Dear Zambian team Thank you very much for revising the survey plan. The identification of the problem and focus of the survey became much clearer and precise! Can we have a small zoom meeting again this week to discuss the survey tools, schedule and cost issues? Once we discuss and agree those things, you can start preliminary survey. Thank you very much. Best regards, Satoshi Kusaka

No.	日時	国(所属)	ML本文
80	11/18	ザンビア	Subject: [JICA-Maths:80] Thank you very much for your understanding. We are ready to meet you on Thursday at 09hr zambian time. Thank you Shelly
81	11/18	研修実施者	Subject: [JICA-Maths:81] Dear Team Zambia and Mr. Kusaka Good day from Japan. As Shelly san suggested, Japan Team would like to hold a meeting with Zambia Team as follows. Data: November 19th, 9:00 am (Zambia Time), 4:00pm (Japan Time) Please click the link below. If you have any problem on the day of meeting such as network connectivity and so on, please let us know. We are looking forward to see you tomorrow! Have a nice day. Sincerely, Nanae Yasukawa
82	11/18	研修実施者	Subject: [JICA-Maths:82] Budget guideline Dear everybody, Good afternoon. This is Takuya Baba, Hiroshima University. I am aware that all teams are engaged with developing the research plan now. As a leader of this training course, I am really happy to see this new trial as taking a shape despite of COVID difficulties. By the way, after receiving the first plan, I have been communicating with JIC A chugoku and JICA offices in respective country. We have made "Budget request principles" for your request as attached. Please refer to this principle when you revise a budget plan. Hiroshima university team is in charge of confirming and advising the research activity, and JICA offices are in charge of confirming and managing it financially. As I said during the first session, during this training course, we will learn and practice evidence-based curriculum development in a small scale. Our focus is not on a generalization of the claim but on capacity building to plan, implement and analyze a research for the claim. After all these endeavors, I hope that we will be able to develop a joint research paper in future. I wish you stay safe with your family. warm regards, Takuya Baba
83	11/18	ザンビア	Subject: [JICA-Maths:83] Thank you we will see you tomorrow. Shelly
84	11/18	ザンビア	Subject: [JICA-Maths:84] Good morning, thank you for enlightening us on the program and also on issues concerning the budget. Shelly
85	11/19	マラウイ	Subject: [JICA-Maths:85] Dear Prof Takuya Baba Good morning, Thank you very much for sharing us Budget Request Principles. These budget principles will surely guide us as we revisit our budget. Thank you very much here once again. Luke Eliya
86	11/19	マラウイ	Subject: [JICA-Maths:86] Thank you so much for the clarification. Best regards, Tionge
87	11/19	研修実施者	Subject: [JICA-Maths:87] Zambian team, thanks for the discussion today. Dear Zambian team Thank you very much for today's discussion. Your plan is getting sharp and meaningful for the purpose of the evidence-based curriculum revision. Please make a final plan including what we discussed today, especially survey schedule. We agreed that you make two groups, and each group conduct survey for todays. Please indicate what to do in each day as we discussed. If possible, please include the name of schools and survey date. Thank you very much. Best regards, Satoshi Kusaka
88	11/19	マラウイ	Subject: [JICA-Maths:88] Thank you so much for the clarification. Best regards, Tionge

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89	11/20	研修実施者	<p>Subject: [JICA-Maths:89] Request for sharing the revised survey plan 【Malawi Team】</p> <p>Dear Mr. Luke, Dr. Saka (Malawi Team)</p> <p>Good day from Japan.</p> <p>I hope this email finds you well.</p> <p>I would like to kindly ask for sharing the revised survey plan when it is ready.</p> <p>I am sure that you are nicely working on it and you are about to communicate with us.</p> <p>In addition to finalization of the contents of the survey plan before preliminary survey, we can confirm little more details on the budget plan as well based on the principle provided from Prof. Baba.</p> <p>After confirmation of above issues via one more zoom meeting together, we are going to move on the submission of the survey plan to JICA office in Malawi and visiting of the schools for data collection.</p> <p>Hopefully, we can move on to the data collection around next week so that we can get ready for the mid-term presentation in December.</p> <p>If you have any inquiries, please kindly let me know.</p> <p>Have a nice day!</p> <p>Sincerely, Nanae Yasukawa</p>
90	11/20	研修実施者	<p>Subject: [JICA-Maths:90] FW: Ethiopia Team_Study proposal</p> <p>Dear Ethiopian team</p> <p>Good morning.</p> <p>I'm sure you conduct discussion within the team nicely.</p> <p>In terms of the survey schedule, as Prof. Baba mentioned, we expect you to visit schools and conduct survey for 1 or 2 days only.</p> <p>It might be good you make two teams for the field survey.</p> <p>I would like to kindly ask for sharing the revised survey plan including the budget, when it is ready.</p> <p>Hopefully, we would like to move on to the data collection around next week.</p> <p>If you have any inquiries, please kindly let me know.</p> <p>Satoshi Kusaka</p>
91	11/20	マラウイ	<p>Subject: [JICA-Maths:91] Re: Request for sharing the revised survey plan 【Malawi Team】</p> <p>Dear Nanae,</p> <p>Thank you for your email.</p> <p>This week has been a busy week for us. We have not yet finished revising the plan. We are done with revising the budget and instruments. We are remaining with the technical part of the plan. We plan to submit the full revised package on Monday, 23 November. For the budget, we took Prof Baba's guidelines into consideration.</p> <p>As for the date and time for the last zoom meeting before trial testing the instruments, I suggest that we fix it after your studying the revised plan.</p> <p>Best regards, Tionge For The Malawi team.</p>
92	11/20	研修実施者	<p>Subject: [JICA-Maths:92] Re: Request for sharing the revised survey plan 【Malawi Team】</p> <p>Dear Dr.Saka, Malawi team</p> <p>Thank you very much for your prompt reply although you are very busy with your duty and training tasks.</p> <p>It is very good to hear that revision of the survey plan is progressing nicely.</p> <p>When you have done with making of the revised survey plan, please kindly share with us.</p> <p>I will consider your revised plan with team members in Japan as soon as possible for sharing final adjustments before starting of the trial.</p> <p>Hopefully we can have a zoom meeting in the beginning of next week so that we can move on to the trial of the data collection in the later part of next week.</p> <p>Thank you very much for your kind cooperation.</p> <p>Have a good day!</p> <p>Sincerely, Nanae Yasukawa</p>
93	11/22	ザンビア	<p>Subject: [JICA-Maths:93] Good morning. i have forwarded the survey plan for your attention. Thank you Shelly</p>
94	11/22	研修実施者	<p>Subject: [JICA-Maths:94]</p> <p>Dear Shelly, Zambian team members,</p> <p>Thank you very much for finalizing your survey plan.</p> <p>I confirmed the content and schedule.</p> <p>You revised nicely what we have discussed last week</p> <p>I just edited the formatting a little bit.</p> <p>Please submit the attached file to JICA Zambian office to proceed your preliminary field survey.</p> <p>As Ayumi mentioned, it is good to take pictures and videos when conducting the survey and share with us by Facebook.</p> <p>If you have any inquiries, please let us know.</p> <p>Best regards, Satoshi Kusaka</p>

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95	11/22	ザンビア	Subject: [JICA-Maths:95] Thank you very much for your support. We will do as advised. Good afternoon. Shelly
96	11/23	研修実施者	Subject: [JICA-Maths:96] FW: WEEK 3 REPORT & BUDGET - TEAM ZAMBIA Dear Justin, Zambian team, Thank you very much for submitting the week 3 report. I'm sharing it to everybody. I hope you can conduct your survey as planned this week! Best wishes Satoshi Kusaka
97	11/23	ザンビア	Subject: [JICA-Maths:97] thank you very much we have received Shelly
98	11/23	マラウイ	Subject: [JICA-Maths:98] Dear Nanae and Kusaka, Find attached the revised survey plan. We feel we have taken care of the discussions we had with you and the guidelines sent to us by Prof Baba. Best regards, Tionge For Malawi Team
99	11/23	研修実施者	Subject: [JICA-Maths:99] Dear Dr. Saka Thank you very much for sharing the revised survey plan of Malawi Team. I will talk to you very soon again after checking the attached file. Your active participation is highly appreciated. Sincerely, Nanae Yasukawa
100	11/24	マラウイ	Subject: [JICA-Maths:100] Dear Ms Nanae and Mr Satoshi Greetings from Malawi. Please find, attached, Week 3 Report for Team Malawi. We are very sorry having delayed submitting the report. We had a very busy schedule with official engagements. For and on behalf of Team Malawi Luke
101	11/24	研修実施者	Subject: [JICA-Maths:101] Re: [Malawi] - Revised survey plan Dear Dr. Saka, Mr. Luke (Malawi Team) Good day from Japan. Please kindly check the attached file. I am impressed that the part of problem statement is now focusing on more specific and concrete problems. In addition, we are thankful that you have created the improved instruments based on our discussion last time. In terms of contents and instruments, this survey plan is now ready to move on to the trial. However, I would like to ask you to take annex 6 and 7 (yellow part) into the last consideration. When you have done with final modification on annex 6 and 7 based on the attached file, please kindly send me back the modified version of your survey plan. After checking your modified survey plan, I would like to ask you to submit the finalized survey plan to the JICA office then let us move on to the data collection in the field. If you don't have further inquiry with attached file, I don't intend to hold a zoom meeting in this time. (If you think we need it, you are most welcome though) Thank you very much for your cooperation. Sincerely, Nanae Yasukawa
102	11/24	研修実施者	Subject: [JICA-Maths:102] Comments on the weekly report (Zambia and Malawi) Dear Zambia team, Malawi Team Thank you very much for your continuous submission of the weekly report. Please kindly check the attached file for getting some comments on your weekly report. This week will be an important week since many teams planned to go for the data collection. In order to make the field survey more successful, making of the field notes is highly recommended. You can take a note whatever you noticed in the field so that the sentences you expressed in the note at that moment will be the clue for both reflections and revision for the upcoming main survey. Please kindly let us know if you have any questions or concerns regarding the weekly report. Have a good day! Sincerely, Nanae Yasukawa
103	11/24	ザンビア	Subject: [JICA-Maths:103] Thank you very much for your continuous guidance and support. We are learning a lot. Thank you Shelly

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104	11/24	マラウイ	Subject: [JICA-Maths:104] Dear Ms Nanae Thank you very much for your quick feedback on our draft survey plan. We will look into it and consequently revise the said Annexes 6 and 7. Thank you and best regards. On behalf of Team Malawi Luke
105	11/26	マラウイ	Subject: [JICA-Maths:105] Dear Nanae, Find attached the revised survey plan with with completed annexes 6 and 7. Best regards, Tionge
106	11/27	ザンビア	Subject: [JICA-Maths:106] Good morning. The Zambian team has successfully done the preliminary survey. We are asking for you guidance on the way forward. The JICA office in Zambia was also helpful to make the exercise successful Thank you. Very much. Shelly
107	11/27	研修実施者	Subject: [JICA-Maths:107] Re: Zambian team, thanks for the discussion today. Dear Shelly, Zambian team, Thank you very much. We are happy about your news! You will present the result in the second online training in December 10, So, please analyze and discuss the result within your team. Once you summarize the result and analysis please share it with us, so that all the members can comment and discuss on it. We are also glad if you could share photos and videos in the preliminary survey on the Facebook. Best regards, Satoshi Kusaka
108	11/27	研修実施者	Subject: [JICA-Maths:108] Re: [Malawi] - Revised survey plan Dear Dr. Saka. Mr. Luke Cc. JICA Chugoku Thank you very much for sharing the revised survey plan. We deeply appreciate that you have created it very precisely. Based on the revised one, I have adjusted only the format and the part of the budget. As you know, the transportation will be fully arranged by the JICA office so we don't need to mention the cost. They will manage it for you once you ask them to arrange it after submission of this survey plan. Daily allowance also will be provided based on the regulation in the JICA office in Malawi, and consumables will be reimbursed when you submit the receipt to the JICA office in Malawi. I would like to ask you to submit the attached survey plan to both the JICA office in Malawi and JICA Chugoku, as a finalized version of the survey plan before the preliminary survey starts. I hope you will have a fruitful time in data collection. If you have any questions, please kindly let me know. Have a good day. Sincerely, Nanae Yasukawa
109	11/27	ザンビア	Subject: [JICA-Maths:109] Thank you for your guidance. Good morning. Shelly
110	11/27	研修実施者	Subject: [JICA-Maths:110] FW: How is the situation in Ethiopia? Dear Abiy and Ethiopian team, Thank you very much for letting us know your situation. I understand you are very busy with your work, and school is closed currently. As I mentioned in previous e-mail, please specify the focus a bit more. Can you make any hypothesis about what kind of problems students face in addition and subtraction? Have you already known any challenges or problems from previous researches or from your experiences? If so, the research question and survey tools will be more specific. It would be great that you could conduct a small survey before the second training (Dec.10), if the schools open. Even one class and small number of students are fine. Please let us know once you revise the survey plan and sample size. Best regards, Satoshi Kusaka
111	11/27	エチオピア	Subject: [JICA-Maths:111] Dear Kusaka, Like I said in the earlier mail, school opening is not certain especially for primary school due to COVID. However, we are ready to modify the research question based on your suggestion. Regards, Abiy

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112	11/27	JICA	<p>Subject: [JICA-Maths:112] Dear Dr. Saka. Mr. Luke Good morning I check your survey plan and seems nice. Before proceeding budget support, could you inform me how far is it from your place to District Education Manager office and also to primary school? We will decide the budget based on the distance(Km). Thank you, JICA Malawi Office</p>
113	11/28	マラウイ	<p>Subject: [JICA-Maths:113] 11/28 Dear Mr Naomi Good morning. From Malawi Institute of Education (MIE) to Zomba Rural District Office, it is approximately 17 km one way (using Google maps). From MIE to Domasi Demonstration Primary School, the distance is approximately 3.2km one way (again using Google maps). Thank you very much. For, and on behalf of Team Malawi Luke</p>
114	11/28	研修実施者	<p>Subject: [JICA-Maths:114] 11/28 Dear Abiy, Thank you for your reply. Yes, we understand your situation. We hope the COVID situation gets better and schools open. Regards, Satoshi Kusaka</p>
115	11/28	研修実施者	<p>Subject: [JICA-Maths:115] Re: FW: How is the situation in Ethiopia? Dear Abiy san and Ethiopian team, Good evening. We are worried about your situation because we watch the news about it in the TV. I hope that all of you are safe. Please give the warmest regards to all the members. warm regards, Takuya Baba</p>
116	11/30	研修実施者	<p>Subject: [JICA-Maths:116] Dear Justin, Zambian team Good morning. Thank you very much for submitting the week 4 report. I'm sharing it to everyone. It would be very nice if everyone reads, give comments and question to Zambian team. Zambian team, please continues to discuss the result of the preliminary survey among team members. Best regards, Satoshi Kusaka</p>
117	12/1	研修実施者	<p>Subject: [JICA-Maths:117] Dear Zambia Team Thank you very much for sharing the 4th week report. I am surprised that it has already been a month, we have started this training. And thank you very much for all your efforts. Please kindly see the attached file that I commented on. I know you had a very fruitful time in the field with your team members so I am curious about what you found and felt in the classroom during observation. I would be most grateful if other members of the training can give a feedback or question to Zambia team from your perspective. Thank you for your cooperation in advance. Sincerely, Nanae Yasukawa</p>

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118	12/1	研修実施者	<p>Subject: [JICA-Maths:118] Dear Dr.Saka, Mr. Luke (Malawi Team) Good day from Japan. I hope everything is well with you. Since you have planned to visit the schools for data collection from tomorrow, I would like to just confirm the upcoming schedules from now to mid-term presentation on December 10th (Thu). Once you collect the data, please kindly proceed for the inputting the data and data analysis as you planned in the submitted survey plan. In addition to that, we need to start thinking of how to organize the mid-term presentation. I would be most grateful if we could have a zoom meeting right after successful completion of the data collection so that we can have a clear view for preparing the mid-term presentation. Please kindly let me know the appropriate date and time for you sometime on the 4th to 7th December. When you visit the school, please kindly take some photos so that we can share what the situation looks like with other members. Thank you for your attention and best of luck for the survey. Sincerely, Nanae Yasukawa</p>
119	12/1	ザンビア	<p>Subject: [JICA-Maths:119] Thank you very much. Good morning. Shelly</p>
120	12/1	マラウイ	<p>Subject: [JICA-Maths:120] Dear Nanae, I hereby confirm that our schedule for the survey is still as communicated. As for the zoom meeting, we will communicate to you on the proposed day and time before the end of the day tomorrow. We will also submit our week 4 report by the end of the day tomorrow. Thank you for your support. Best regards, Tionge For Malawi team.</p>
121	12/2	マラウイ	<p>Subject: [JICA-Maths:121] Dear Nanae, We suggest that the proposed zoom meeting should be held on Friday, 4th December, from 7:30am, Malawi time. Best regards, Tionge For Malawi Team</p>
122	12/2	マラウイ	<p>Subject: [JICA-Maths:122] Dear Nanae and Satochi, Please find attached week 4 report for the Malawi team. Best regards, Tionge For Malawi Team</p>
123	12/2	研修実施者	<p>Subject: [JICA-Maths:123] Dear Dr.Saka, Mr.Luke Thank you very much for your prompt arrangement of the schedule.. Based on your suggestion, we would like to set the meeting in the following schedule. Date: December, 4th Time: 7:30am (in Malawi), 2:30pm (in Japan) Please join the meeting from the URL below. In the meeting, I would be grateful if I could hear the status of data collection. Based on that, I hope we can share some images of what we prepare for the upcoming midterm presentation to present our progress and next challenges. Please kindly let me know if you have any questions or concerns. I hope you will have a valuable time in the field and the data collection today. Sincerely, Nanae Yasukawa</p>
124	12/2	研修実施者	<p>Subject: [JICA-Maths:124] Dear Dr. Saka (Malawi Team) Thank you very much for the submission of the 4th weekly report. We will share the comments after checking the report of your team. Sincerely, Nanae Yasukawa</p>
125	12/2	マラウイ	<p>Subject: [JICA-Maths:125] Thank you Nanae. This has been noted. Best regards, Tionge</p>

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126	12/3	研修実施者	<p>Subject: [JICA-Maths:126] Dear Ethiopian team, Good morning. How is the survey plan discussion going? We are glad if you could share the progress through the weekly report. Thank you very much. Regards, Satoshi Kusaka</p>
127	12/4	研修実施者	<p>Subject: [JICA-Maths:127] Dear Malawi Team Good morning. Please kindly receive the commented 4th weekly report of your team. I appreciate that you accommodate the tasks of the training although you are busy with your duty. See you soon in the zoom meeting and I am looking forward to hearing from you. Sincerely, Nanae Yasukawa</p>
128	12/4	研修実施者	<p>Subject: [JICA-Maths:128] Dear Dr.Saka, Mr. Luke Thank you very much for participating in the 2nd zoom meeting today. We are very glad to know that data collection of the preliminary survey has been successfully done. Just for our information, I would like to emphasize that we can summarize our insight in terms of not only the constructed survey plan but also the actual procedure of the data collection and the preliminary results from both qualitative and quantitative aspects. In addition to that, I would be most grateful if you could share the emergence of your awareness and feeling in terms of positive impact of the training despite difficulties under covid-19. I was very impressed with what you shared with us on the topic above in today's meeting. Please feel free to contact us if you have any questions. Have a nice day! Sincerely, Nanae Yasukawa</p>
129	12/4	マラウイ	<p>Subject: [JICA-Maths:129] Dear Ms Nanae and Mr Kusaka Greetings from Malawi! Thank you very much for organising a zoom meeting, and your insights on how we (Team Malawi) should organise data from our preliminary survey as we prepare for the Thursday, 10th December 2020 midterm Zoom meeting. We found all your suggestions very helpful and goal focused. We will take them into consideration. Please find, attached, Week 5 report for Team Malawi for your feedback. Kind regards, Luke</p>
130	12/7	研修実施者	<p>Subject: [JICA-Maths:130] Dear Mr.Luke (Malawi team) Thank you very much for submitting the 5th weekly report of your team. Please kindly check the comments on the report. I found that the plan of your team had been successfully carried out. Although we had a very fruitful discussion in the zoom meeting, I would be most grateful if you could documentate them in the weekly report as well. I have written some examples from my point of view, please kindly have a look at it. If you have any questions or concerns in terms of both weekly report and data analysis, please do not hesitate to contact us. Have a nice day! Sincerely, Nanae</p>
131	12/7	マラウイ	<p>Subject: [JICA-Maths:131] Dear Nanae Thank you very much for your timely feedback onto our Week 5 report. We will go through all the comments made, and do the needful. Kind regards. Luke For Team Malawi</p>

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132	12/7	研修実施者	<p>Subject: [JICA-Maths:132] Dear all participants Good Evening from Japan. This is Ayumi who belong to Hiroshima University. I hope you find the monthly report through Link below to capture each country's progress during November 2020. This report was created based on the weekly reports which you submitted and Facebook posts. In the beginning of this training, we expected E-mail can make cross-country communication, however, it was not realized feedbacks/comments each country on submitted documents. Therefore, the interaction of E-mail is not countable at this time. In the upcoming training on 10th, we have an opportunity to reflect on own progress until current. I will explain in more detail. Best regard, Ayumi OKA</p>
133	12/7	研修実施者	<p>Subject: [JICA-Maths:133] Dear all, Greetings from Hiroshima. I would like to send a reminder message to you. Please find the attached document, "2nd session program". We will start at exact time as scheduled. You can enter zoom meeting by the below URL. Please prepare the mid-term presentation for the 2nd session on 10th December. I am sending the guideline for the mid-term presentation as attached. Each team has 20 minutes for the presentation. If you have any question, please ask in this mailing lists. We can share questions and answers to understand well. See you soon. Best regards, N. Furukawa Hiroshima University</p>
134	12/7	研修実施者	<p>Subject: [JICA-Maths:134] Dear all, Greetings from Hiroshima. I would like to send a reminder message to you. Please find the attached document, "2nd session program". We will start at exact time as scheduled. You can enter zoom meeting by the below URL. Please prepare the mid-term presentation for the 2nd session on 10th December. I am sending the guideline for the mid-term presentation as attached. Each team has 20 minutes for the presentation. If you have any question, please ask in this mailing lists. We can share questions and answers to understand well. See you soon. Best regards, N. Furukawa</p>
135	12/7	マラウイ	Subject: [JICA-Maths:135] Received thanks. Tionge
136	12/7	ザンビア	Subject: [JICA-Maths:136] Thank you we have received. Shelly
137	12/7	マラウイ	Subject: [JICA-Maths:137] Noted with thanks. Luke
138	12/9	研修実施者	<p>Subject: [JICA-Maths:138] Dear Nasilele, Zambian team Thank you very much for submitting the weekly report. I'm sharing it to everybody. You worked on every day last week for analyzing the data! I'm sure you did good discussion among team members. We are looking forward to your presentation on Thursday. Regards, Satoshi Kusaka</p>
139	12/9	ザンビア	Subject: [JICA-Maths:139] Good morning thank you very. Shelly

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140	12/10	研修実施者	<p>Subject: [JICA-Maths:140] Dear Shelly, Zambian team Good morning. Thank you very much for sharing the preliminary survey report. It is a fantastic work! I just run through the report. Your finding and analysis are fascinating very much. Let's discuss in today's session, and we can continue to discuss for the main survey. Regards, Satoshi Kusaka</p>
141	12/11	研修実施者	<p>Subject: [JICA-Maths:141] Dear Malawi Team Greeting from Hiroshima. Thank you very much for participating in the session yesterday. We all were very impressed with your effort and contribution. We would like to save your presentation file used in the mid-term presentation yesterday. Since the size of the file is big, please share the file by following the instructions below. 1. Click the link below 2. Log in with the following ID and password 3. Upload the file Click the "Upload" and select your file Once you upload the file there, please let me know via email so that I can go to check in for the downloading the file. If you have any questions, please let me know anytime. Thank you for your cooperation in advance. Sincerely, Nanae Yasukawa</p>
142	12/11	研修実施者	<p>Subject: [JICA-Maths:142] Dear Malawi Team Greeting! I hope you had a relaxing time after completing the session yesterday. I would like to share some ideas of what we can try next till Christmas holidays. Since we have got a lot of insightful comments from Prof.Baba yesterday, we can proceed to make a survey plan for the main survey. Please go over the preliminary survey plan and take the following elements into consideration for further improvement so that we can get ready to start the final survey in the beginning of January 2021. Research site and participants Research instruments Data collection procedure and analysis method Budget plan Especially the revision of research instruments and the plan of data collection procedure and analysis method will be crucial in this phase I think. Once you made the revision of these elements, could you please make a survey plan for the main survey just in the same way as you made one for the preliminary survey? I hope we can check your survey plan for the main survey before Christmas holidays by zoom meeting so that we can finalize it. If you have any other ideas, comments or questions, please kindly let me know. Have a nice day! Sincerely, Nanae Yasukawa</p>
143	12/11	マラウイ	<p>Subject: [JICA-Maths:143] Dear Nanae, Thank you for your email. We will work on the assignments and will propose the date and time for the virtual meeting when we get ready. Best regards, Tionge For Malawi team.</p>

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144	12/11	研修実施者	<p>Subject: [JICA-Maths:144] Dear Dr.Saka (Malawi team) Thank you very much for your prompt reply. We are looking forward to hearing from you. By the way, you told me that you have developed the excel file with the format for inputting and organizing the preliminary survey data. I would be grateful if you could share that excel file with us so that we can also consider the revision for the main survey together. Your kind cooperation is highly appreciated. Sincerely, Nanae Yasukawa</p>
145	12/11	マラウイ	<p>Subject: [JICA-Maths:145] Dear Nanae, We have uploaded the files on Gigapod. Best regards, Tionge</p>
146	12/11	研修実施者	<p>Subject: [JICA-Maths:146] Dear Dr. Saka Thank you very much for your kind cooperation. The Presentation file of your team has been nicely received. Sincerely, Nanae Yasukawa</p>
147	12/11	研修実施者	<p>Subject: [JICA-Maths:147] Dear all members Hello I'm Yoshitaka ABE from Japan. Thank you for participating in the 2nd session yesterday. The presentations by each team were excellent, and we hope the session was useful and deep learning for everyone. We also understand the situation of the Ethiopian team very well. We are looking forward to having the final session with the three teams again. I inform you about the attached document. As I mentioned in the reflection part of the session, I send a new weekly report. The right side has changed a bit and you can select the point following the Professional Standards domain. Please be aware of these domains when you do self-reflection. I would like to say again that thank you for your hard work on the implementation survey and report writing. I know you will be busy towards the end of the year, but we look forward to keeping in touch with you. Best regards Mr.Yoshitaka ABE</p>
148	12/11	マラウイ	<p>Subject: [JICA-Maths:148] Received with thanks. Best regards, Tionge</p>
149	12/13	マラウイ	<p>Subject: [JICA-Maths:149] Dear Yoshitaka ABE Thank you very much for your reminder and guidance regarding the changes in the format for weekly reports. I would like to request you to share with us the document on Professional Standards Domain you are referring to (which you also presented during the second online session) for our periodic reference. I do not know if the document was already shared but cannot locate it. Thank you Luke</p>
150	12/14	研修実施者	<p>Subject: [JICA-Maths:150] Dear Zambian team Thank you very much for joining the second online training last week. Congratulations on your very nice presentation! Let's proceed to make a survey plan for the main survey. I think what you should do for the main survey and writing final report as follows. 1. Main survey - Conduct the same types of survey to other teachers for increasing the sample size. (I wrote some suggestion in the attached file.) - Concerning the semi-structured interview, please always ask why (reason) after their answer. 2. Writing the final report - Analyze the curriculum and textbook more concretely and find the gap between intended and implemented curriculum. - Make specific suggestion for curriculum based on the gap between intended and implemented curriculum. Once you can make a main survey plan, please share with us. Please include the internet connection fees as consumable in budget plan. I hope we can check your survey plan for the main survey before Christmas holidays by zoom meeting. Kind regards, Satoshi Kusaka</p>

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151	12/14	マラウイ	<p>Subject: [JICA-Maths:151] Dear Ms Nanae (and HU-Team), Greetings from Malawi! Herewith a report from the Malawi Team. Thank you very much. Luke For the Malawi Team</p>
152	12/14	研修実施者	<p>Subject: [JICA-Maths:152] Dear all Good afternoon from Japan. I would like to inform you about how to use Dropbox once again. "Dropbox" is one of the online storage services. This online training uses it as a shelf of document archives, and communication tool. All documents until today have been stored in Dropbox. Trainees can be just checking and downloading training materials and exchange comments by pasted in the document. When commenting on documents stored in Dropbox, you need to enter your email address and password registered. If you don't have account, please create personal Dropbox account by yourself. It is needed to write comments. Please visit the links below, and you can find directly midterm presentation documents. Zambia Team's document Malawi Team's document Exchanging comments and questions are valuable to further development of the research. Sending a message using Mailing List "*****@ml.hiroshima-u.ac.jp", is also appreciated as well as Dropbox comments. I am looking forward to seeing your digital communication. Best regard, Ayumi OKA</p>
153	12/14	研修実施者	<p>Subject: [JICA-Maths:153] Dear Mr. Luke (and Malawi team) Greetings from Japan. I hope you had a very good weekend. Thank you very much for sharing the report of week 6. We deeply appreciate that you and Dr.Saka demonstrate the reflection on what you gained from the session last Thursday. I and Mr. Abe will read it over carefully and we will send you back the file with our comments soon. I know you have asked Mr. Abe regarding the file of professional standards, so let me attach it to this email. As Ms. Oka mentioned you can actually find all the previous materials of this training in dropbox, so please have a look if you are interested in. I am sure that you are now nicely moving on the development of the main survey plan. Please feel free to contact us if you have any questions and concerns. Sincerely, Nanae Yasukawa</p>
154	12/14	マラウイ	<p>Subject: [JICA-Maths:154] Dear Nanae-san, Thank you very much for your quick response. Kind regards, Luke</p>
155	12/14	マラウイ	<p>Subject: [JICA-Maths:155] Dear Ayumi-san, Thank you very much for reminding us of what is contained in Dropbox. True, I checked and found all the training information right there. I found it very helpful. Thank you Luke</p>
156	12/14	マラウイ	<p>Subject: [JICA-Maths:156] Dear Nanae, We are in the process of revising the instruments and writing the survey plan as advised and we hope to submit the revised instruments by Thursday, 17th December. We propose that we should have the zoom meeting on Friday, 18th December at 8am - Malawi time. Best regards, Tionge For Malawi Team</p>

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157	12/14	研修実施者	<p>Subject: [JICA-Maths:157] Dear Dr.Saka (Malawi Team) Thank you very much for sharing the status of the revision. Quick action of your team is always highly appreciated. As you suggested, let us schedule the next zoom meeting on the following date and time. Date: December 18th, Friday Time: 8 am (in Malawi), 3pm (in Japan) Please join the meeting via the following link and pass cord. If you have any questions and concerns, please do not hesitate to contact me any time. Your kind cooperation is highly appreciated appreciate. Sincerely, Nanae Yasukawa</p>
158	12/14	マラウイ	<p>Subject: [JICA-Maths:158] Dear Nanae, Thank you. This is noted. Best regards, Tionge</p>
159	12/15	研修実施者	<p>Subject: [JICA-Maths:159] Dear Mr. Luke (and Malawi Team) Greetings from Japan! Thank you very much for the submission of the 6th weekly report. I and Nanae san checked and commented on the report. please check them and use them for your reflection and activities. Sincerely, Yoshitaka ABE</p>
160	12/15	研修実施者	<p>Subject: [JICA-Maths:160] Dear Justin, Zambian team, Good morning. Thank you very much for submitting the Week6 report. I'll share it to everybody. We hope you continue the discussion for the final survey and report writing. We are looking forward to seeing your final survey plan. Kind regards, Satoshi Kusaka</p>
161	12/15	研修実施者	<p>Subject: [JICA-Maths:161] Dear Zambia Team Greetings from Hiroshima! Thank you very much for sharing the weekly report. We found that you were able to gain some ideas during the last session despite the difficulties due to the network connection. Please kindly receive the commented one for the report of the 6th week. As we mentioned during the session, we would like to introduce the revised format for writing of the weekly report. I am sharing the revised format with you in this email. Please try to use the revised one from next week's weekly report. Thank you for your cooperation in advance. Have a good day. Sincerely, Nanae Yasukawa</p>
162	12/16	ザンビア	<p>Subject: [JICA-Maths:162] Thank you very much. We will use it to report starting from this week. Regards. Shelly</p>
163	12/17	マラウイ	<p>Subject: [JICA-Maths:163] Dear Nanae-san Greetings from Malawi! Please find, attached, the documents captioned above. The first part of the document (background, research questions, methodology, and so on) will remain the same. I am sorry I have delayed sending you these documents. I thought I had already sent you them until this afternoon when I realised I had not. Sorry for the likely inconvenience this delay will cause. Kind regards Luke For Team Malawi</p>
164	12/18	研修実施者	<p>Subject: [JICA-Maths:164] Dear Luke san, Malawi team Good morning from Hiroshima! Thank you very much for sharing the document. We will read it nicely and let's meet up soon on Zoom meeting as we scheduled. Thank you for your cooperation. Sincerely, Nanae Yasukawa</p>

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165	12/18	研修実施者	<p>Subject: [JICA-Maths:165] Dear Dr. Saka, Mr. Luke (Malawi Team) Thank you very much for participating in the meeting from early morning. It was nice to have a very detailed discussion with you on the instrumentation of the survey. I felt that many points which we discussed today are very small and detailed but important elements to be considered from your perspectives too. As we discussed in the meeting, please kindly let us know when the final survey plan is ready. You can send us the survey plan with a full format by email whenever it is ready to be implemented. Your kind cooperation is highly appreciated. Hope you have happy holidays! Sincerely, Nanae Yasukawa</p>
166	12/25	ザンビア	<p>Subject: [JICA-Maths:166] Good morning. we apologize for being quiet for a long time. this was due to some measures beyond our control. however, we are working to improve the survey plan so that we submit next week. but we need to be guided how the main survey will be conducted. Are we suppose to conduct the reach as a group or as individuals? for instance in Lusaka we are three should we visit different schools or work as a group again. If we will work as a group how many schools should we visit? we need your guidance so that we can complete our methodology and budget. the second issue is on the rescheduling of the opening day for schools from 4th January to 18th January 2021. This will also affect our data collection against handing in the final survey in February. complement of the season. thank you. Shelly</p>
167	12/26	研修実施者	<p>Subject: [JICA-Maths:167] Good morning Shelly, Zambian team, Thank you very much for telling us the current progress and situation. I think it is good to make two groups same as preliminary survey. The research scale (the number of schools, teachers and students) can be also the same as the preliminary survey. BUT, it is better to visit different schools if possible. You found out the current situation in preliminary survey, therefore in main survey, you should better investigate the reason behind by asking 'why'. I understand the difficult situation that the school opening changed to 18th January. Let's think about the better way in this circumstance. Once you complete the plan, let's have a zoom meeting. I wish you Merry Christmas and happy new year. Kind regards, Satoshi Kusaka</p>
168	12/27	ザンビア	<p>Subject: [JICA-Maths:168] Thank you very much. We will let you know our progress this week. Thank you. Regards. Shelly</p>
169	12/31	研修実施者	<p>Subject: [JICA-Maths:169] Dear Justin, Zambian team, Thank you very much for submitting a weekly report. Let me share it to everybody. Concerning the budget for the main survey, let's discuss in Zoom meeting sometime next week. Once you make a plan for main survey, please share with us. Thank you very much for your active participation. Have a Happy New Year! Kind regards, Satoshi Kusaka</p>
170	1/4	研修実施者	<p>Subject: [JICA-Maths:170] Dear Zambia Team New year's greetings from Japan! I hope you had good holidays. May this New Year bring happiness and joy for you and your family. Thank you very much for sharing the last weekly report. Please kindly receive the commented one. We are excited to have a fruitful time through this training with you in 2021. Have a nice day! Sincerely, Nanae Yasukawa</p>

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171	1/11	マラウイ	Subject: [JICA-Maths:171] Dear Nanae, Find attached the revised survey plan. We have put everything together and we have taken care of the comments made during the 10th and 18th December zoom meetings. We are set for the main survey which we are starting tomorrow (12th January). Best regards, Tionge For Malawi Team
172	1/11	マラウイ	Subject: [JICA-Maths:172] Dear Nanae, Find attached the Malawi report for the week beginning 4 to 8 January 2021. You will notice that we did not submit reports for the weeks 21 – 25 December and 28 December 2020 – 1 January 2021 This is just because we went on a Christmas break for 2 weeks, from 18th December and we resumed our work on 4 January 2021. Best regards, Tionge For Malawi Team
173	1/11	研修実施者	Subject: [JICA-Maths:173] Dear Dr. Saka (Malawi team) Good morning. I hope you had good holidays in Malawi. Thank you very much for sharing the revised survey plan. We hope all what we discussed will work successfully from tomorrow. If it is possible, please take some photos and videos of the field survey and please share it with us later. Since you are carrying the plan very smoothly, we have enough time for preparing the final report and presentation on February 18th. I hope we can meet up again via zoom once you finish data processing and preliminary analysis of the data. I wish all the best for the field survey. Sincerely, Nanae Yasukawa
174	1/11	研修実施者	Subject: [JICA-Maths:174] Dear Dr. Saka (Malawi Team) Thank you very much for submitting the weekly report. We understood that it was a holiday for the last two weeks. Please kindly receive the commented one. Your continuous efforts and active participation are highly appreciated. Sincerely, Nanae Yasukawa
175	1/13	研修実施者	Subject: [JICA-Maths:175] Dear Zambian team, Good morning. How is the progress of main survey proposal? It would be good if we could finalize through Zoom meeting in this week or early next week, so that you can submit to JICA Zambia office. Kind regards, Satoshi Kusaka
176	1/14	ザンビア	Subject: [JICA-Maths:176] Thank you. Sorry for being quiet for a long time and not finished the survey plan. Shelly was seroius sick since 28th December, 2020. Am much better now though still weak. We hope to complete our survey plan and work with you as programmed. Regards Shelly
177	1/14	研修実施者	Subject: [JICA-Maths:177] Dear Shelly, Thank you very much for your reply. I understand the situation. Please take care of your health. I hope you will get well soon. Kind regards, Kusaka
178	1/19	マラウイ	Subject: [JICA-Maths:178] Dear Nanae, I would like to let you know that data collection was not completed due to the declaration that schools close for three weeks. We were remaining with data from one class from one school. We have therefore collected data from 30 learners out of the planned 40 learners. With this development, we will therefore work on the data that we have collected. Best regards, Tionge For Malawi team

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179	1/19	ザンビア	<p>Subject: [JICA-Maths:179] Good afternoon. we are in putting on the main survey and hope to have a zoom meeting by Friday this week. but the issue at hand is that schools are closed up to 31st January,,2021. this mean that if there wont be any more disturbances we wish to collect data in the second week of february,2021. Regards. thank you. Shelly</p>
180	1/19	研修実施者	<p>Subject: [JICA-Maths:180] Dear Dr. Saka (Malawi Team) Thank you very much for sharing the progress of yours. I hope you and Luke-san are doing well in Malawi. It is good to know that at least you were able to collect the data from 30 learners. I am sure that the collected data will provide us new insights so please proceed as you explained. As I remember, you have organized the data on the excel sheet in the preliminary survey. Once you have finished inputting the data and preliminary data analysis, I hope we can briefly hear from you about the results and findings. Thereby, we can share some images for further analysis and discussion, and we can also plan how to organize the presentation and the final report paper. Your prompt sharing of the information is highly appreciated. Sincerely, Nanae Yasukawa</p>
181	1/19	研修実施者	<p>Subject: [JICA-Maths:181] Dear Shelly, Zambian team, Good afternoon, thank you very much for reporting the situation. We may collect additional data only the interview to teacher, even though it is difficult to conduct full survey. Anyway, on Friday, let's discuss what we can do in this limited situation. Even we cannot conduct the survey, we can analyze the data of preliminary survey more profundity and make suggestion for curriculum revision. What time are you available on Friday? If it's after 11:00 Zambian time, any time is ok for me. Kind regards, Satoshi Kusaka</p>
182	1/20	ザンビア	<p>Subject: [JICA-Maths:182] Thank you we will communicate the time tomorrow. Let me rehearse with the team. Thank you Shelly</p>
183	1/21	研修実施者	<p>Subject: [JICA-Maths:183] Dear Justin, Zambian team Thank you very much for your reply Let's have a Zoom meeting tomorrow at 12 hours Zambian time. We will discuss the main survey, especially what and how shall we conduct it in this difficult situation. See you tomorrow. Satoshi Kusaka</p>
184	1/21	ザンビア	<p>Subject: [JICA-Maths:184] thank you very much i have taken note of. Good afternoon. Shelly</p>
185	1/25	研修実施者	<p>Subject: [JICA-Maths:185] Dear Zambian team, Thank you very much for joining the Zoom meeting on last Friday. I attached the framework which we used in the discussion. For the final report, please discuss and clarify the followings as we discussed in the meeting. Identify the problems by analyzing the collected data more deeply. -Consider where the each problem you found can be placed in the framework. -Consider what the reason of the problems are and where they can be placed in the framework. Make specific suggestions to the textbook & syllabus (and teachers' guide as well) -Consider the relationship among subdivided components of the curriculum logically. If you can conduct main survey, please interview teachers the reason 'why' they use the methodologies as they are in the textbook, as Nanae-san suggested. I wish you complete the survey and writing report nicely. If you have any question, please ask us anytime. Thank you very much, Satoshi Kusaka</p>

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186	1/27	マラウイ	<p>Subject: [JICA-Maths:186] Dear Nanae-san Greetings from Malawi! We hope you are all well. Please find, herein, Team Malawi's weekly reports for Weeks 7 and 8. We have far much delayed submitting these reports because our New Year has just started with a lot of very tight official engagements. Despite this, we will make it to do everything regarding main survey data analysis, report writing, and sharing. Thank you very much. Luke-san For Team Malawi</p>
187	1/27	研修実施者	<p>Subject: [JICA-Maths:187] Dear Luke san Greetings from Japan! I hope you and Dr. Saka are doing well. Thank you very much for sharing the weekly report of the Malawi Team. We understood your situation and we appreciate your continuous commitment for carrying out the survey despite your tight schedules. According to your report, I understood that you are working on entering the data nowadays. I hope we can have a zoom meeting sometime this week or early next week, regarding the plan for data analysis and preparation for the final report and presentation. It doesn't really mean that we confirm what you have done, rather I wish we can share some ideas for what we are going to do from now on. I am sure that your schedule is highly occupied with your official engagements, please let me know whenever it is appropriate for you and Dr. Saka. Your kind cooperation is always appreciated. Sincerely, Nanae Yasukawa</p>
188	1/27	ザンビア	<p>Subject: [JICA-Maths:188] Thank you very much for the guidance. If there will be change in the school calendar we will go as advised by you. Thank you Shelly</p>
189	1/28	マラウイ	<p>Subject: [JICA-Maths:189] Dear Nanae-san, Thank you very much for your email. We shall come back to you as I link up with Dr Saka. This week, we are both away from office. Kind regards. Luke</p>
190	1/29	研修実施者	<p>Subject: [JICA-Maths:190] Dear Luke san and Dr. Saka Good day from Japan. Luke-san, thank you very much for sharing your schedule for this week. I understood that you and Dr. Saka's schedules of this week are occupied with official engagements. I would be grateful if you could give us a chance to meet up, whenever you two are getting available. Please kindly receive the attached file that I commented on. I deeply appreciate your active participation despite your busy schedule. Please take care of yourself always. Sincerely, Nanae Yasukawa</p>
191	1/29	研修実施者	<p>Subject: [JICA-Maths:191] Dear Nanae san Thank you very much for sending us feedback on our weekly reports. We have found your suggestions very useful as we continue doing the course. About meeting with you (HU-Team) by Zoom, we (Team Malawi) propose if we could do so (meet) as follows DATE: Tuesday, 2nd February 2021 TIME: 8:00am (Malawian time) Thank you very much Luke</p>

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192	1/29	研修実施者	<p>Subject: [JICA-Maths:192] Dear Luke san Thank you very much for proposing the schedule for our next Zoom meeting. As you suggested, let us have a meeting as follows. Date: February 2nd, Tuesday Time: 8:00 am (in Malawi), 3pm (in Japan) Please join the meeting from the following link and passcord. As I wrote before, this meeting aims to discuss what we are going to do from now till final presentation (and even after this training). I guess you are still in the process of analyzing the data so please kindly share with us whatever you are doing or finding now. In addition, It would be helpful if you could share the excel file as well, as far as you entered so that we can also know the whole picture of your effort. Your kind cooperation is highly appreciated. Sincerely, Nanae Yasukawa</p>
193	1/29	ザンビア	<p>Subject: [JICA-Maths:193] we are pleased to inform you that schools will be opening on 1st February 2021. we will go a heard to do the research in the first week. we will send the survey plan next week on Monday thank you. Shelly</p>
194	1/29	研修実施者	<p>Subject: [JICA-Maths:194] Dear Shelly, Zabian team Thank you very much for the information. That's good news! It would be great if you could conduct even only interview to the teachers. The additional interview will support the data of preliminary survey, so that you can make more specific suggestion to the current curriculum and textbook with evidence. Thank you for your continuous commitment and effort, Satoshi Kusaka</p>
195	2/2	マラウイ	<p>Subject: [JICA-Maths:195] Dear Nanae, Find attached the excel sheet you requested. The data is however not complete. I have submitted it to you just to make sure that we are on the same page during the meeting we have today in about 40 minutes' time. Best regards, Tionge For the Malawi Team</p>
196	2/2	研修実施者	<p>Subject: [JICA-Maths:196] Dear Dr. Saka Good morning. Thank you very much for sharing the excel file. I will have a look at it before our meeting starts. I am thankful for your kind cooperation from the early morning. See you soon. Sincerely, Nanae</p>
197	2/2	マラウイ	<p>Subject: [JICA-Maths:197] Dear Nanae, Find attached the revised instruments that we used during the study. Best regards, Tionge</p>
198	2/2	研修実施者	<p>Subject: [JICA-Maths:198] Dear Dr. Saka, Mr. Luke Thank you very much for your proactive participation in today's meeting! We all were very impressed with your continuous challenges in this training. Especially, I would like to mention that your autonomous internalization of the suggestion given to the Zambia team was highly impressive. Also, how Luke san connected his experience in Japan to this training course was also a notable moment of today's meeting. We will try our best to explore and deepen this research with you. Again, thank you very much for your active participation! Sincerely, Nanae</p>

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199	2/2	研修実施者	Subject: [JICA-Maths:199] Dear Malawi team, Thank you very much for the discussion today. I'm sharing some articles which we discussed today. Addition and subtraction using base 10 (beyond counting on strategy) Empirical study of USA, Russia, Taiwan Japanese case Intended and implemented curriculum framework Baba (2010) referred by Kusaka (2020) Arai(2020)
200	2/2	研修実施者	Subject: [JICA-Maths:200] Dear Dr. Saka Thank you very much for sharing the instruments. We will check them and the excel file for further exploration of the results. Sincerely, Nanae Yasukawa
201	2/2	ザンビア	Subject: [JICA-Maths:201] Good evening, I forward the revised main survey plan for Zambian team for your attention. we have tried to revise the tools especially the semi - structured interview. you can look at them and guide us before we go in the field on Friday this week. I will also forward the survey plan to JICA office in Zambia for assistance. thank you Shelly
202	2/3	研修実施者	Subject: [JICA-Maths:202] Good morning Zambian team, Thank you very much for sharing the survey plan. I'm glad you are able to conduct the main survey. The interview plan is OK basically. In addition to the current questions, it would be good to ask about the teacher's knowledge of meaning of multiplication ('repeated addition' and 'grouping')from the mathematical perspective. For example: ✓Showing the two types of introduction in the textbook ('repeated addition' and 'grouping'), ask teachers to explain the difference from mathematical points of view. ✓What are the benefits of using repeated addition as introduction of multiplication? ✓What are the disadvantage of using only 'repeated addition' as the meaning of multiplication? I hope you conduct the main survey successfully. Thank you very much for your active participation! Kind regards, Satoshi Kusaka
203	2/3	マラウイ	Subject: [JICA-Maths:203] Dear Mr Satoshi Kusaka (and all HU-Team) Thank you very much for sharing with us some articles related to the research we have just carried out. Surely, these articles will help us see where our primary school students as well as their mathematics teachers are, and where we (as a country and curriculum developers) want them to move towards so that we have something to focus on as we do subsequent curriculum reviews. Kind regards Luke san
204	2/3	マラウイ	Subject: [JICA-Maths:204] Dear Satochi, Thank you so much for sharing the articles. They will really assist in improving the literature for the study. Best regards, Tionge
205	2/3	ザンビア	Subject: [JICA-Maths:205] Good morning. Thank you very much for acknowledging our survey plan and for making additional information. It will be helpful to deepen our survey. Thank you Shelly
206	2/9	ザンビア	Subject: [JICA-Maths:206] Good afternoon. Sorry for not communicating to you. On Friday we managed to collect data for our main survey. We have started working on it and will share before handing in so that you guide us. we will also share pictures we captured during our survey. Thank you Shelly

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207	2/9	研修実施者	Subject: [JICA-Maths:207] Good afternoon, Shelly, I'm glad you conducted the survey even in the difficult situation! I'm sure you collected good data to support and deepen your analysis of preliminary survey. Once you complete the draft report, please share it with us. Thank you, Satoshi Kusaka
208	2/12	研修実施者	Subject: [JICA-Maths:208] Dear Team Zambia and Malawi Greetings from Japan. I would like to inform you the guideline for the final presentation and final report. Please kindly check the attached file for confirming the guideline. For the powerpoint slides, you need to submit it by February 17. And for the final report, you need to submit it by February 18. If you have any questions regarding the guideline, please feel free to contact me. Thank you very much for your attention. Sincerely, Nanae Yasukawa
209	2/12	研修実施者	Subject: [JICA-Maths:209] Dear Team Malawi Good day from Japan. I hope this message finds you well. As I sent the guideline for the final presentation and final report, we are now time to finalize our product. Could you please kindly update your current status of the data analysis, preparation for the final presentation and final report? If you have any problem or question regarding the preparation of final presentation and final report, please do not hesitate to contact us. Thank you very much for your cooperation. Sincerely, Nanae Yasukawa
210	2/12	研修実施者	Subject: [JICA-Maths:210] Dear Zambian team, Good afternoon. I hope you have been preparing the final report by discussing among members. I have two things to inform you. ü Final report and PPT presentation Please develop the final report and presentation according to the guideline that Ms. Nanae sent us in previous e-mail. Could you send the final report(draft) by Monday? (I'm sorry for the short notice.) I'll check it and give feedback immediately, so that you can finalize the report, and develop the PPT presentation based on the finalized report. If necessary, we can also have zoom meeting. ü Activities you did in January and February. You haven't submitted the weekly report since January, but I'm sure you have done a lot in January and February, for example, discussion among you or with us, visiting schools to conduct survey, data analysis, etc. Please share with us just the date and what you did in January and February. Thank you very much for your active participation. Kind regards, Satoshi Kusaka
211	2/12	ザンビア	Subject: [JICA-Maths:211] Thank you we have taken note of. Goodafternoon Shelly
212	2/12	ザンビア	Subject: [JICA-Maths:212] Good afternoon. We have received and taken note of. Shelly
213	2/15	ザンビア	Subject: [JICA-Maths:213] Good morning . sorry to inform you that am unable to send the document today as discussed. we are still working on it and will be sent in the night when done. thank you. Shelly
214	2/15	研修実施者	Subject: [JICA-Maths:214] Good morning, Ms. Shelly. Thank you very much for letting us know. Please send it to us once you are done this evening. I hope you have fruitful discussion among team members. Kind regards, Satoshi Kusaka
215	2/15	研修実施者	Subject: [JICA-Maths:215] Dear Justin, Zambian team Thank you very much for submitting weekly report. I'll share it with everybody. Concerning the activities in January, could you summarize just the date and what you did? Kind regards, Satoshi Kusaka

No.	日時	国(所属)	ML本文
216	2/15	研修実施者	<p>Subject: [JICA-Maths:216] Dear Zambia Team and Malawi Team Greetings from Japan. I hope this email finds you well. For the Zambia team, thank you for sharing the weekly report and please kindly receive the commented file. As Mr. Kusaka mentioned, we are sure that you dedicated your time for the activities of this training in January. So, please use the attached format (red tabs) and fill in the only yellow sells to mention your activity. Yo don't really have to go in details so please just briefly share with us what you did, as much as you remember. For the Malawi team, I am sure you are very busy for finalizing the materials for final presentation and report. I am sorry for asking you when you are busy but we are grateful if you could tell us the activities in the last week of January and first and second week of February. You can also utilize the attached format for the Zambia team and if you do not have enough time to fill in everything, please tell us at least the activities what you dedicated. Please give the priority to the final presentation and report and whenever you have space to do it, please share it with us. Your active participation is always appreciated. See you soon on February 18th. Sincerely, Nanae Yasukawa</p>
217	2/16	ザンビア	<p>Subject: [JICA-Maths:217] Thank you very much. We are indeed busy working on the final report. The zambian team collected data on the 5tj of February and so we are working to beat the deadline. Thank you very much. Shelly</p>
218	2/16	研修実施者	<p>Subject: [JICA-Maths:218] Dear all members of Team Ethiopia, Greetings from Hiroshima. I would like to send the invitation of our final session for JICA training "Mathematics Curriculum Development at Primary Level". We welcome your attendance at the final session, if you are interested in other country's final presentation. I am sending a program as attached. ***** Topic: Mathematics Curriculum Development at Primary Level 2020 Date: February 18th, 2021 Time: 9:00am (Ethiopia) Zoom Meeting URL: ***** Best regards, N.Furukawa/Hiroshima University</p>
219	2/16	ザンビア	<p>Subject: [JICA-Maths:219] Thank you we have taken note of. I hope you have also sent to the JICA Zambia office so that they can assist us with convenient meeting place. Shelly</p>
220	2/17	ザンビア	<p>Subject: [JICA-Maths:220] Good evening. I know that side is night but am sorry I I could not finish drafting the presentation on time due to covid 19 disturbances. I have forwarded the draft report for your attention before we make a final report.you can make your comment and adjustment direct to me so that I can make changes where necessary. I call it a draft. because we are still working on it before making a power point presentation. thank you. Shelly</p>
221	2/17	研修実施者	<p>Subject: [JICA-Maths:221] Dear Ms. Shelly, Zambian team Thank you very much for sharing the draft. It is organized well including what we discussed in previous Zoom meeting. Two suggestions: ü I highlighted some important paragraph by red color, so please include them nicely in the final presentation PPT. ü In terms of recommendation to the syllabus, I added a table to write more concrete and specific suggestion. Please fill the table. I think your survey is very meaningful in that you made specific recommendations to curriculum, textbook revision based on not only curriculum document analysis but also the finding of teachers' real situation by interview and lesson observation. Please finalize the report and develop your final presentation PPT. We are looking forward to seeing your final presentation tomorrow! Thank you, Satoshi Kusaka</p>
222	2/17	ザンビア	<p>Subject: [JICA-Maths:222] Thank you very much. Goodmorning. Shelly</p>

No.	日時	国(所属)	ML本文
223	2/18	研修実施者	Subject: [JICA-Maths:223] Good morning, Zambia & Malawi team, I hope you have been preparing your presentation for today's session. If possible, please share the PPT & report with us beforehand. We are looking forward to your final presentation. See you later. Satoshi Kusaka
224	2/18	研修実施者	Subject: [JICA-Maths:224] Dear all, Greetings from Hiroshima. I would like to send today's program and text as attached. We will start at exact time as scheduled, please access Zoom meeting 10 minutes before the starting time. You can enter zoom meeting by the below URL. Zoom Meeting URL: Please prepare the final presentation & report and share the data with us. Each country has 20 minutes for the presentation. See you soon. Best regards, N. Furukawa/Hiroshima University
225	2/18	マラウイ	Subject: [JICA-Maths:225] Survey report draft. Tionge
226	2/18	研修実施者	Subject: [JICA-Maths:226] Dear all, Please upload your presentation data in the following space and inform us by e-mail. You can do after today's program, but we need the data today. Best regards, N.Furukawa
227	2/18	ザンビア	Subject: [JICA-Maths:227] Thank wil do that wil send at night and you find it tomorrow morning. Shelly
228	2/19	ザンビア	Subject: [JICA-Maths:228] Good morning. I have forwarded the main report for your consideration. Thank you. Shelly
229	2/19	ザンビア	Subject: [JICA-Maths:229] Good morning. Main Survey final attached. Shelly
230	2/19	ザンビア	Subject: [JICA-Maths:230] Good morning I have forwarded the document for your consideration. thank you. Shelly
231	2/19	ザンビア	Subject: [JICA-Maths:231] Good morning I have forwarded the document for your consideration. thank you. Shelly
232	2/19	研修実施者	Subject: [JICA-Maths:232] Dear Ms. Shelly, Zambia team Thank you very much for sharing your final presentation and report. As Professor Baba mentioned, it is good to publish your work to Zambia Journal of Teacher Professional Growth (ZJTPG). First, I'll arrange the format to fit the ZJTPG based on your report. After that, we can polish up the paper together to submit. Please give me some time. Thanks again to join our training, and I'm very glad to continue to learn together with you. Kind regards, Satoshi Kusaka
233	2/19	研修実施者	Subject: [JICA-Maths:233] Dear Dr. Saka, Luke-san (Malawi Team) Greetings! Thank you very much for your final presentation yesterday. We were very happy to see the findings which you discovered in your field in collaboration with us. As Prof. Baba suggested, I would be grateful if you could publish your work to the journal. As you know, the professional knowledge that you created through this training is expected to be accumulated in the context of your country so that it can really contribute to the development of mathematics education in Malawi. In this sense, I need your kind help to think of what journal would be appropriate to submit your paper. Could you please think about where we can submit? After thinking of the potential journals, I hope we can start thinking of how to re-organized final report in the format of the journal paper. Again, thank you very much for all your effort in this training despite many challenges.. I learned a lot from you all through this training and I hope we could see each other in the near future in Malawi or Japan. Sincerely, Nanae Yasukawa

No.	日時	国(所属)	ML本文
234	2/19	ザンビア	Subject: [JICA-Maths:234] Good morning, thank you very much for the interaction we had with you and all the members of the Hiroshima JICA team. we appreciate your guidance and help you rendered up the end of the program. you can go ahead and polish it because we did the final report in a hurry. Thank you very much we will wait for your input. indeed it will be an opportunity for us to contribute the community. thank you once more. Shelly
235	2/19	研修実施者	Subject: [JICA-Maths:235] Dear Zambia team ,Malawi team and all parties Hello First of all, I appreciated your grateful presentation yesterday. We were really impressed by your effort to improve your own curriculum through these activities although you have had limitations or challenges because of COVID-19. I'm sure that not only did we share knowledge and skills, but we also had a great time together, which led to the growth of each of our abilities. We hope to keep this connection and exchange ideas to deepen our understanding of the curriculum and education that each country is aiming for. Let's both take care of our health and look forward to the day we can meet again! 安部喜敬(Mr.Yoshitaka ABE)
236	2/19	ザンビア	Subject: [JICA-Maths:236] Lovely. Lupando
237	2/20	マラウイ	Subject: [JICA-Maths:237] Dear Mr Yoshitaka ABE Thank you very much for your email. Indeed we shared and benefitted a lot in terms of knowledge, skills, and other valuable experiences. For that, we are very grateful to the Government of Japan through JICA as and the entire HU-Team for the support we received throughout the course. We wish you good health as well. Kind regards Luke
238	2/22	研修実施者	Subject: [JICA-Maths:238] Request for sharing the presentation materials【Malawi】 Dear Malawi Team Greetings! I hope this message finds you well. As prof. Baba mentioned during the final presentation, we would be grateful if you could share the presentation materials (powerpoint slide) that you used on the final presentation. Please click the following URL and log in with ID and password below. You can find the place to upload your powerpoint slides when you log in. After uploading the file, please let me know via email so that we can visit there to download it. We are most grateful if you could do it, as soon as possible so that we can share it with the JICA office too. In addition to that, we have got your final report (word file) on the day of the final presentation from Dr. Saka via email. And, on the title page, it says "draft report". It is okay, if you simply forgot to change the name of the title, we will modify it by ourselves. However, if you have created a finalized one, please share the final version with us. I am sorry to ask you many things when you are busy. Thank you very much for your cooperation in advance. Sincerely, Nanae Yasukawa
239	2/23	マラウイ	Subject: [JICA-Maths:239] Dear Nanae, Thank you for your email. I am sorry for the late response. I have uploaded the presentation on Gigapod. As for the report that I submitted on the day of the virtual meeting, it should still be considered as draft. There are some sections that need to be worked on. Unfortunately, this week is a busy one for me and Mr Eliya. We hope to finalise it next week by Wednesday. Best regards, Tionge
240	2/24	研修実施者	Subject: [JICA-Maths:240] Dear Dr. Saka Greetings. I hope this email finds you and Luke san well. Thank you very much for sharing the presentation material. We would like to inform you that your file has been successfully received. For the final report, Thank you very much for continuously working on further enhancement. We are looking forward to hearing from you again when it is ready. Again, your kind cooperation despite the busy schedule is highly appreciated. Please take care of yourself always. Sincerely, Nanae Yasukawa

Students' strategies in solving additive relationship problems in the early years' mathematics curriculum in Malawi

REPORT

by

Luke Eliya

Tionge Saka

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Malawi

18 February 2021

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1.0 Background

The importance of early numeracy skills and their relevance in later mathematical development has received increased interest (Jordan, Glutting & Ramineni, 2010; Aunio & Räsänen, 2015). Researchers agree that numeracy performance in the early years predicts later mathematics performance (Jordan, Glutting & Ramineni, 2010, Aunio & Niemivirta, 2010). Studies in Malawi, however, reveal consistent poor achievement of learners in mathematics in the early years. Table 1 summarises the results from selected studies.

Table 1: Learners achievement in selected studies

Source and year	Mean achievement in Mathematics by Class				
	2	3	4	5	7
MoEST (2014)- MLA	40.3%		55.1%		36.5%
MIE (2008)	58.4%			26.63%	
Maganga, Mwale, Mapondera & Saka (2010)		41.16%			24.64%
MoEST (2010) - PASS		20%		11%	11%

This poor performance might limit youth's positive contribution to sustainable economic growth and personal development and opportunity. According to Mulera, Ndala and Nyirongo (2017), whilst in the achievement levels, learners were closely associated with the levels of inputs and services. Their further analysis showed that learners' low socioeconomic status, high pupil-teacher ratios and the more time head teachers spent in teaching other than on school management were more significant factors that negatively affected learners' performance. In this survey, we were? not investigating any of the above factors but we explored the limited opportunities for development of strategies for solving additive relationship (addition and subtraction) problems in the Malawian Primary Mathematics Curriculum, arguing that the packaging of the intended curriculum is negatively affecting the attained curriculum as the implemented curriculum has some gaps.

The framework for evidence-based curriculum development guided the activities that carried out in this survey. Figure 1 shows the processes involved in evidence-based curriculum development.

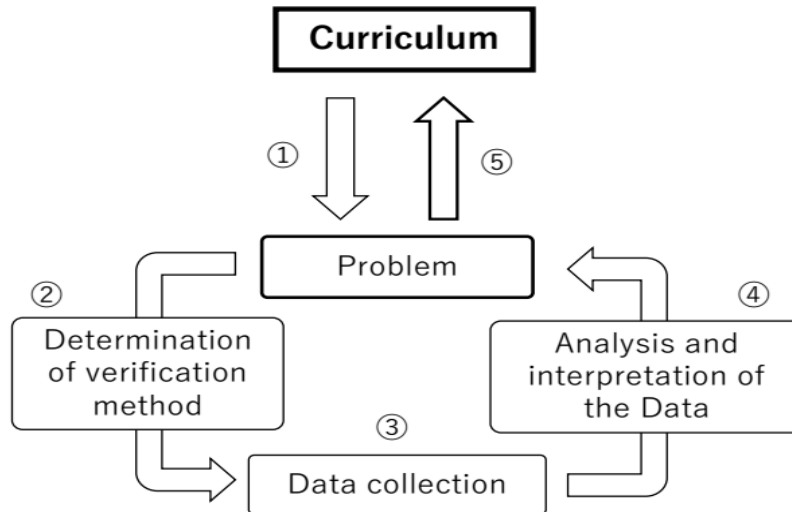


Figure 1: Evidence based curriculum development

Following this framework, the problems to be verified in the current curriculum were identified. The methodology for verifying the problem was arrived at. This led into the data collection phase. The collected data was consequently analysed and interpreted. Specific recommendations for curriculum revision based on evidence found was provided.

1.1 Related literature for the study

Place value and base-ten structures

Multi-digit knowledge includes knowledge of the numeration system and place value (Hiebert & Wearne, 1996). Thompson and Bramald (2002) distinguish quantity value from column value. For example, with quantity value, 47 is split into forty and seven, while with column value, it is split into 4 units of tens and 7 units of ones. They argue that children's mental strategies only depend on quantity value.

Developing the work of Steffe and colleagues, Cobb and Wheatley (1988) distinguished three levels in which children construct ten as a unit. The levels were evident in children's

thinking in additive tasks. Children operating at level 1 manipulate tens unit and ones unit separately, and cannot coordinate them. At level 2, children can coordinate counts or collections of tens and of ones, in the context of representations of the quantities, but they cannot “simultaneously construct a numerical whole and the units of tens and ones that compose it” (p. 7). Learners at level 3 can anticipate, without representations that a numerical whole consists of tens and ones units, and coordinate operations with these.

Sequence-based structures and strategies

When children begin to use base-ten structures in arithmetic, they develop a variety of multi-digit addition and subtraction strategies (Foxman & Beishuizen, 2002; Thompson & Smith, 1999). Sequence-based or jump strategies involve keeping the first number whole and adding (or subtracting) via a series of jumps, for example, $57 + 26$ as $57 + 10 = 67$, $67 + 10 = 77$, $77 + 3 = 80$, and then $80 + 3 = 83$. Collections-based or split strategies involve partitioning both numbers into tens and ones, and adding (or subtracting) separately with tens and ones, for example, $57 + 26$ as $50 + 20$ and $7 + 6$, then $70 + 13$, and then $(70 + 10)$ and 3 to get $80 + 3$ or 83 just as above.

Children’s broad knowledge of number relationships and numeration is important for their mental computation (Heirdsfield, 2001). This includes knowledge of sequential structure: jumping by ten off the decade, locating numbers, number word sequences across decades, and making small hops (Fuson et al., 1997). However, low-attaining children seem to use jump strategies less frequently and many do not develop knowledge of jumping in tens (Foxman & Beishuizen, 2002).

Beishuizen (1993, p. 295) used the labels N10 and 1010 to signify these two categories. N10 (or the jump strategies) involves the child adding or subtracting from a number, for example, solving $56 + 31$ by first adding 30 (or 10 and 10 and 10) to 56, and finally adding 1. 1010 (or the split method) involves working separately with the tens and ones, for example, solving $56 + 31$ by first adding 50 and 30, and then adding 6 and 1, and so on. Several other research studies have similarly described these two categories of children’s strategies or cognitive orientations. The N10 and the 1010 categories correspond

respectively to (a) children's counting-based and collections-based interpretations of 2-digit numbers (Cobb and Wheatley, 1988); (b) the cumulative and partial sums categories of additive strategies (Thompson, 1994, p. 333); (c) sequence-tens and separate-tens types of strategies (Fuson, et al., 1997); and (d) the incrementing and combining tens and ones types of invented algorithms for multi-digit addition and subtraction (Carpenter, et al., 1999, pp. 70-3).

1.2 Description of the problem to be verified in the current curriculum

Literature presents several strategies for solving additive relationship (addition and subtraction) problems, and these include:

- Direct modelling (count-all, take away)
- Count-on
- Using known facts (e.g., doubles), bridge-through 10,
- Counting-based and collections-based strategies (i.e., jump and split methods)
- Count-back from, count-to, compensation (using known facts)

A study of the current curriculum reveals that only direct modeling is used in the instructional materials, in turn, providing limited opportunities for the development of additive relationship thinking. For example, in adding 4 to 3. Learners usually have objects before them. They count 4 objects, then count 3 objects. They then put the two groups of objects together and count all the objects to get 7. The current survey will, therefore, explore the extent to which teachers know and use other strategies not outlined in the curriculum. The findings of this survey will provide a basis for inclusion, in the curriculum, other strategies for solving additive relationship problems. Because according to Siemon (nd), a prolonged reliance on inefficient strategies such as “make-all-count-all” or “counting-by-ones” is both developmentally dangerous and professionally irresponsible¹.

¹ See www.education.vic.gov.au/studentlearning/teachingresources/maths

2.0 Objective and Research Questions

The objective of the study was to find out the strategies used by teachers and learners in solving additive relationship problems. To achieve this, answers to the following research questions were sought:

1. What strategies do teachers use in teaching addition and subtraction problems?
2. What strategies do learners use in solving addition and subtraction problems?
3. Are there any strategies used by learners but not taught by teachers?

3.0 Methodology

A case study methodology was used in the survey. Oral assessment and interviews were the data collection methods that were employed. The survey was conducted over a period of four months. The survey began with a preliminary survey whose aim was to pretest the instruments.

3.1 Data collection

Data were collected from two purposefully selected schools in Zomba, both schools were from rural area. Only schools from the rural area were sampled because of their proximity to the researcher's work place. We planned to select a sample of 40 learners was randomly from standards 2 and 3 learners (20 from standard 2 and 20 from standard 3). The selection was planned in such a way that there would be equal representation between male and female learners. However, schools had been closed due to Covid-19 pandemic. As such, we managed to use only 30 learners. The sampled learners were assessed on how they calculated additive relationship problems. The oral assessment lasted for not more than 20 minutes for each learner. The standard 2 learners were assessed on what they covered in standard 1 (see annex ...). Similarly, standard 3 learners were assessed on what they covered in Standard 2 (see annex ...). This is so because data collection was done in week 2 of the first term of the 2021 academic year. Learners were video recorded as they worked out the given problems during oral assessments. Further, the plan was to interview four mathematics teachers who taught the learners in standards 1 and 2 (see annex ... for the tool). Instead, we managed to interview only three mathematics teachers as schools had been closed before we completed the data collection exercise.

Before data collection, the instruments were trial tested to increase the validity of the collected data. In this case, data from one school was collected from 16 learners (8 from standard 1 and 8 from standard 2). Further, data were collected from teachers of the learners who provided the data. Revision of the instruments based on the findings from the trial testing was made.

In addition to the approaches described above, we planned to collect data through document analysis. Documents such as schemes of work and lesson plans were supposed to be reviewed to check what was taught in the area of interest in this study. Learners' notebooks were also supposed to be reviewed to see how the learners worked out addition and subtraction problems. It was however difficult to get this data as both teachers and learners did not bring the required documents to school on the day the data was collected.

3.2 Ethical consideration

Teachers and learners were asked about their willingness to participate in the survey before collecting data from them. The purpose of the survey was clearly explained to them and they were informed that they were free to accept or reject to participate in the survey.

3.3 Data analysis

The quantitative data collected from the survey were entered in excel and analysed using both excel and Statistical package for social sciences (SPSS). Descriptive statistics were computed and presented in table form. Report writing followed soon after the data analysis.

On the other hand, qualitative data that were collected were read and re-read to get well versed with the data and to identify themes in the data. The research questions informed the development of such themes. The data were then categorised into organised patterns. This was followed by the descriptions which provided in-depth analytic descriptive narratives about a sequence of events for instance, describing the strategies teachers used in teaching additive relation problems. These were then presented in the report in the form of quotations which included illustrative direct statements from responses to a question in an interview or a description of the process learners followed in performing additive problems.

4.0 Results and Findings

The results of the study and findings are presented in this section. The sections starts with presenting the results. A presentation and discussion of the findings follow.

4.1 Characteristics of respondents.

4.1.1 Characteristics of learners who participated in the study

The mean ages of learners are shown in table 2.

Table 2: Learners age by class

Learners' class	Mean age	N	Std. Deviation
Standard 2	8.25	20	1.4
Standard 3	9.90	10	1.7

4.1.2 Characteristics of teachers who participated in the study

There were three teachers that participated in the study. All the three teachers were female. Two were standard 1 teachers while one was a standard 2 teacher. The mean age of the teachers was 41. Two of the teachers had been teaching for 7 years while one of them had been teaching for 25 years. Two of the teachers had 5 years teaching mathematics in infant (Standards 1 and 2) classes.

4.2 Strategies used by learners in solving addition problems

There were four addition problems that each learner was supposed to work out. These problems were given to individual learners, one problem at a time. Tables 3 to 6 display the results according to the problem, sex and class.

Table 3: Strategies learners used when solving addition problem 1

Learners' class			Strategy used				Total
			Count all	Retrieval	Guessing	None	
Standard 2	Sex of the learner	Male	6	1	1	1	9
		Female	9	0	1	1	11
	Total	15	1	2	2	20	
Standard 3	Sex of the learner	Male	4	1			5
		Female	5	0			5
	Total	9	1			10	

Table 4: Strategies learners used when solving addition problem 2

Learners' class			Strategy learners used						Total
			Count all	Retrieval	Count all and another	Guessing	None	Split Strategy	
Standard 2	Sex of the learner	Male	4	1		3	0	1	9
		Female	9	0		1	1	0	11
	Total		13	1		4	1	1	20
Standard 3	Sex of the learner	Male	3		2				5
		Female	5		0				5
	Total		8		2				10

Table 5: Strategies learners used when solving addition problem 3

Learners' class			Strategy used						Total
			Count all	Count all and another	Guessing	None	Split Strategy	Count on	
Standard 2	Sex of the learner	Male	2	0	5	2	0	0	9
		Female	2	1	3	3	1	1	11
	Total		4	1	8	5	1	1	20
Standard 3	Sex of the learner	Male	2	3		0			5
		Female	3	1		1			5
	Total		5	4		1			10

Table 6: Strategies learners used when solving addition problem 4

Learners class			Strategy					Total
			Count all	Guessing	None	Decomposition	Split Strategy	
Standard 2	Sex of the learner	Male	2	3	4			9
		Female	3	2	6			11
	Total		5	5	10			20
Standard 3	Sex of the learner	Male	1	0	1	1	2	5
		Female	0	1	1	0	3	5
	Total		1	1	2	1	5	10

Tables 3 to 6 reveal that 8 strategies were used by learners in solving addition problems. These include: count all, retrieval, count all and another strategy, Guessing, decomposition, compensation, split strategy and count on. Some learners could however

not attempt a problem. The most common strategy that learners used in solving addition problems was count all. This was done even with simple addition problems like problem 1. In some cases, count all strategy could be combined by other strategies like count on. This was done by 4 learners in solving problem 2. Very few learners used other strategies. Some learners as observed in the tables used blind guessing. In most cases, the responses they gave were not correct.

4.3 Strategies used by learners in solving subtraction problems

There were four subtraction problems that each learner was supposed to work out. As was the case with problems on addition, these problems were given to individual learners, one problem at a time. Tables 7 to 10 display the results according to the problem, sex and class.

Table 7: Strategies learners used when solving subtraction problem 1

Learners' class			Strategy				Total
			Count all	Retrieval	Guessing	None	
Standard 2	Sex of the learner	Male	6	0	2	1	9
		Female	6	2	1	2	11
	Total		12	2	3	3	20
Standard 3	Sex of the learner	Male	5	0			5
		Female	3	2			5
	Total		8	2			10

Table 8: Strategies learners used when solving subtraction problem 2

Learners' class			Strategy				Total
			Count all	Guessing	None	Compensation	
Standard 2	Sex of the learner	Male	6	2	1		9
		Female	8	1	2		11
	Total		14	3	3		20
Standard 3	Sex of the learner	Male	4			1	5
		Female	5			0	5
	Total		9			1	10

Table 9: Strategies learners used when solving subtraction problem 3

Learners' class			Strategy used					Total
			Count all	Retrieval	Count all and another	Guessing	None	
Standard 2	Sex of the learner	Male	4	0		1	4	9
		Female	7	1		1	2	11
	Total		11	1		2	6	20
Standard 3	Sex of the learner	Male	3		1		1	5
		Female	4		0		1	5
	Total		7		1		2	10

Table 10: Strategies learners used when solving subtraction problem 4

Learners' class			Strategy used					Total
			Count all	Count all and another	Guessing	None	Split Strategy	
Standard 2	Sex of the learner	Male	4		3	2		9
		Female	2		3	6		11
	Total		6		6	8		20
Standard 3	Sex of the learner	Male	2	1		1	1	5
		Female	4	0		1	0	5
	Total		6	1		2	1	10

Tables 7 to 10 reveal a situation similar to what was seen when learners were solving addition problems. Unlike in solving addition problems, relatively very few learners used advanced strategies like compensation.

4.4 Strategies used by teachers when solving addition and subtraction problems

Teachers were given addition and subtraction problems and asked to explain the strategies they use in solving the problems. The interview with teachers revealed that they mostly used the count all strategy in solving both addition and subtraction problems. One teacher had this to say when asked about the strategy she uses when teaching learners how to add 4 to 5;

I use manipulatives. We count 4 manipulatives with learners. We then count another 5 manipulatives. We ask learners to put them together and count all of them from 1 (Standard 1 teacher from school 2).

Similarly, when performing subtraction, one teacher had this to say when asked about the strategy she used when teaching addition problem like this one $8 - 5$;

We use manipulatives or slashes. We count 8 objects. Then we count away 5 to get 3 (Standard 1 teacher from school 1)

One teacher pointed out that she also used count on strategy and split strategy. It was however clear that for addition and subtraction of two digit numbers, the practice was to use column addition where the ones digits were handled separately from the tens digits. The strategy used was however clearly count all in most cases.

When asked about the strategies learners used in solving addition and subtraction problems, teachers were quick to point out that they used the strategies that they taught them and that no new strategy was seen to be used by the learners they taught.

4.4 Findings from the study

The presented results have revealed a lot of what is happening in teaching and learning of addition and subtraction problems. The following are the key findings from the study

Firstly, both teachers and learners mostly use basic addition and subtraction strategies like count all. This is consistent with the planned curriculum that uses count all strategy only in solving the problems. This however is a worrisome situation that need to be looked into. Literature presents several strategies that can be used in solving the problems. The use of basic strategies puts learners at an awkward position as they are denied of opportunities to develop advanced strategies which would make they solve problems in a quick and effective way.

Secondly, some learners used strategies that they were not taught by their teachers. This shows that learners have potential of using the advanced strategies. If more strategies were embedded in the planned curriculum. More learners could be granted opportunity to develop their mathematical thinking unlike the status call.

5.0 Conclusion

The study has shown that there is congruency between the planned, implemented and attained curriculum with some slight deviations on the attained curriculum. This shows that learners have a lot of potential to develop advanced strategies to solving problems if exposed to such strategies. Considering that the planned curriculum is limited in its potential to expose learners to a variety of strategies, more work needs to be done on the curriculum and teacher education to improve the current situation. Suggestions to the curriculum revision are consequently proposed in the next section.

6.0 Suggestions for the curriculum revision

The following suggestions for the revision of the curriculum are made. The suggestions are based on the findings of the study.

1. The infant curriculum should have strategies that will improve learners' mathematical thinking.
2. The curriculum should have approaches that would assist teachers to help learners slowly migrate from relying on concrete objects to working abstractly.
3. The curriculum should introduce games that would assist learners to work on additive relationship strategies.

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Appendices

MALAWI INSTITUTE OF EDUCATION

INTERVIEW GUIDE FOR MATHEMATICS TEACHERS

Teacher's Name: ----- Date: -----

Sex: ----- Standard: -----

School's Name: ----- Teacher's age: -----

1. How long have you been teaching? years
2. How long have you been teaching mathematics? years
3. How long have you been teaching mathematics in infant classes (Standard 1 and/or Standard 2)? years.
4. What teaching strategies have you been using to teach learners to add the following?

(Probes - Why do you teach in the way(s) you have described? What other strategy/strategies could you use to teach learners to add these numbers more quickly or efficiently? How did you know each of the strategies you have just described?

- (i) Addition;
 - i. $4 + 5$

ii. $9 + 7$

iii. $63 + 24$

5. What teaching strategies have you been using to teach learners to perform subtraction of the following?)

(Probes - Why do you teach in the way(s) you have described? What other strategy/strategies could you use to teach learners to add these numbers more quickly or efficiently? How did you know each of the strategies you have just described?)

i. $8 - 5$

ii. $19 - 6$

iii. $39 - 27$

5. What strategies do learners use to do the following actions and/or operations?

(a) Addition;

i. $4 + 5$

ii. $7 + 8$

iii. $29 + 58$

(b) Subtraction

i. $8 - 3$

ii. $14 - 6$

iii. 41 – 19

6. Are there any strategies which learners use on addition, and subtraction but you have not taught them in class? If yes, explain.

(a) Learners' invented strategies on addition

(b) Learners' invented strategies on subtraction (*Probe - How do you support (these) learners' invented strategies?*)

Thank you so much for your time

MALAWI INSTITUTE OF EDUCATION

ORAL ASSESSMENT GUIDE FOR STANDARD 1 LEARNERS

Name of learner: _____	Age: _____	Sex: _____
Standard: _____	Date of interview: __/__/__	
Name of Class Teacher: _____	Time: _____	

Consent

Before we start, I want to tell you my name. My name is _____
and I am a teacher.

- I want to know how children learn mathematics. You were chosen purposively. I would like to request you to help in this. But you do not have to take part if you do not want to.
- We are going to play some counting games and some number games.
- This is **NOT** a test and you will **NOT** be graded on it for school.
- I will **NOT** write down your name so no one will know these are your answers.
- Once again, you do not have to take part in this if you do not want to. Once we begin, if you do not want to answer a question, that's all right. Okay, are you ready to start?

Was verbal consent obtained?

Yes No

If child does not give consent: do not continue with the assessment. Thank the child for his or her time and move on to the next child. If the child gives consent continue here:

Addition tasks for Standard 1 (Probes: *Can you tell me or show me (using manipulatives) how you got the answer (each time a learner finishes working on a task if strategy is unclear)? How else could you find the answer more quickly or efficiently (to elicit learners' alternative ways of calculation or thinking)*)

Task	Description of what the learner is doing	Strategy used
$3 + 2 = \square$		
$3 + 5 = \square$		
$7 + \square = 9$		
$12 + 13 = \square$		

Subtraction tasks for Standard 1 (Probes - How did you get the answer (each time a learner finishes working on a task if strategy is unclear)? How else could you find the answer more quickly or efficiently (to elicit learners' alternative ways of calculation or thinking)

Task	Description of what the learner is doing	Strategy used
$5 - 2 = \square$		
$9 - 5 = \square$		
$8 - \square = 4$		
$19 - 15 = \square$		

Thank you so much for your time

**Task 1: Addition/subtraction problems for
Standard 1**

Name: _____ School: _____

WORKSHEET A (Addition problems for Standard 1)

1. $3 + 2 = \square$

2. $3 + 5 = \square$

3. $7 + \square = 9$

4. $12 + 13 = \square$

SHEET B (Subtraction problems for Standard 1)

1. $5 - 2 = \square$

2. $9 - 5 = \square$

3. $8 - \square = 4$

4. $19 - 15 = \square$

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ORAL ASSESSMENT GUIDE FOR STANDARD 2 LEARNERS

Name of learner: _____	Age: _____	Sex: _____
Standard: _____	Date of Interview: __/__/__	
Name of Class Teacher: _____	Time: _____	

Consent

Before we start, I want to tell you my name. My name is _____
and I am a teacher.

- I want to know how children learn mathematics. You were chosen purposively. I would like to request you to help in this. But you do not have to take part if you do not want to.
- We are going to play some counting game
- s and some number games.
- This is NOT a test and you will NOT be graded on it for school.
- I will NOT write down your name so no one will know these are your answers.
- Once again, you do not have to take part in this if you do not want to. Once we begin, if you do not want to answer a question, that's all right. Okay, are you ready to start?

Was verbal consent obtained? Yes No

If child does not give consent: do not continue with the assessment. Thank the child for his or her time and move on to the next child. If the child gives consent continue here:

Addition tasks for standard 2 learners (Probes:

How did you get the answer (each time a learner finishes working on a task if strategy is unclear)? How else could you find the answer more quickly or efficiently (to elicit learners' alternative ways of calculation or thinking)

Task	Description of what the learner is doing	Strategy used
5 + 4 = <input type="text"/>		
9 + 6 = <input type="text"/>		
37 + 13 = <input type="text"/>		
18 + <input type="text"/> = 25		

Subtraction tasks for standard 2 learners

(Probes: *How did you get the answer (each time a learner finishes working on a task if strategy is unclear)? How else could you find the answer more quickly or efficiently (to elicit learners' alternative ways of calculation or thinking)*

Task	Description of what the learner is doing	Strategy used
$6 - 2 = \square$		
$15 - 9 = \square$		
$17 - \square = 14$		
$48 - 35 = \square$		

Thank you so much for your time

Task 2: Addition/subtraction problems for Standard 2

Name: _____

School: _____

WORKSHEET C (Addition problems for Standard 2)

1. $5 + 4 =$

2. $9 + 6 =$

3. $37 + 13 =$

4. $18 +$ $= 25$

SHEET D (Subtraction problems for Standard 2)

1. $6 - 2 = \square$

2. $15 - 9 = \square$

3. $17 - \square = 14$

4. $48 - 35 = \square$

Thank you so much for your time

添付資料 5 最終報告書 (ザンビア)

JICA Online Course on Mathematics Curriculum Development at Primary level

Main Survey Report.

By

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Zambia Ministry of Education

18th February, 2021

1.0 Background

Outcome- Based Education (OBE) is an approach to learning that Ministry of General Education has adapted, moving away from the behavioral approach (Zambia curriculum framework, 2013). This may mean that the implementation of OBE demanded revised textbook methodology and training of teachers in order to carry out the implementation process effectively. The study emanates from the recognition of problems in teachers' experience when introducing the meaning of multiplication and division at grade 2. The concern is the methodologies used in textbooks on the introduction of the meaning of multiplication and division does not cover all the meanings and also the representation of the two meanings the methodology does not fully address the meaning of the two concepts. This is translated to a classroom because teachers also represent the textbook methodologies to the class the way they are written in the textbooks. This is a problem because teachers heavily depend on textbooks to interpret the curriculum. Therefore, this study determines teachers' experiences of textbooks' representation of the introduction of the meaning of multiplication and division at grade 2.

1.2 Statement of the Problem

Multiplication and division are topics which are introduced at grade 2. The methodology used in primary mathematics textbooks to introduce the meaning of division and multiplication are in procedural way. Teachers also use the textbooks to teach the meanings of the two concepts in the procedural way without being able to translate the knowledge of what actually happens with the process of multiplication and division. For example, the specific outcome on multiplication in the Zambian curriculum is written as express multiplication as repeated addition. The knowledge is written as Grouping items/objects in twos (2s), fives (5s), three (3s) and fours (4s) up to tens (10s) and finding their values. Understand the concept of multiplication using some model (and i.e multiplication as repeated addition e.g. $2+2+2+2 = 4 \times 2$). (Ministry of General Education syllabus 1-7, 2013). Textbooks introduce the meaning of multiplication as repeated addition and groupings but does not cover other models as prescribed by the curriculum maybe it could be that they are not aware of them.

Division specific outcome also is stated as express division as repeated subtraction or sharing. Under knowledge section it is stated as understand the concept of division as repeated subtraction

or sharing (Ministry of General Education syllabus 1-7, 2013). Both the curriculum and the textbooks are passive on other models of division.

The gap is the representation of the meanings of the multiplication and division in the textbooks that affect the mathematical relationships and process for teachers to understand and produce products. The challenge is that teachers teach what is written in the textbooks. This means that both textbooks and teacher's approaches used when teaching multiplication and division do not address all challenges and misconception learners' face on the introduction of the meaning of multiplication and division. Therefore, there is an identified gap in the way textbooks introduces the meanings of multiplication and division in relation to the demands of the mathematics curriculum.

1.3 Purpose of the study

The aim of this study is to determine teachers' experience of textbook representation of the meaning of multiplication and division at grade.2. The outcome of the study could also be of value to the textbook publishers, authors, curriculum designers and teachers of primary mathematics

1.4 Objectives of the study

1.4.1. The general objective of this study is to determine teachers' experiences of textbook representation of the meaning of multiplication and division at grade 2 A case of selected schools in Lusaka and Serenje districts.

The specific objectives of the study are:

1. To establish teachers' awareness of the methodologies used in textbooks when introducing the meaning of multiplication and division. .
2. To determine teachers' experiences of the methodology used in the textbook during the introduction of the meanings of multiplication and division.
3. To explore teachers perceived problems in the methodology used in the textbooks when introducing the meaning of multiplication and division.

1.4.2 Research questions

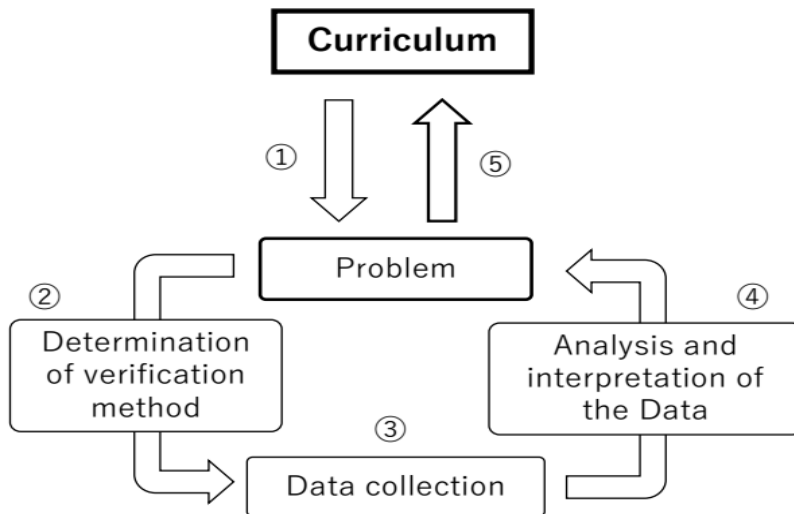
- a .Are teachers aware of the methodologies used in textbooks when introducing the meaning of multiplication and division?
- b. what are teachers’ experiences of the methodologies used in textbooks during the introduction of multiplication and division?
- c .What are teachers’ perceived problems in the methodology used in the textbooks when introducing the meaning of multiplication and division?

1.5 Significance of the study

It is hoped that the findings of the study shall lay the basis for understanding of teachers’ experiences of the textbook presentation during introduction of the meaning of multiplication and division. It may also inform policy makers and Curriculum Developers on how best textbook methodology can be written and be used in a classroom by the teachers to enhance understanding of the meaning of multiplication and division.

1.6 Conceptual framework

The framework for evidence-based curriculum development will guide the activities that will be done in this survey. Figure 1 shows the processes involved in evidence- based curriculum development.



The steps from 1 to 5 shown in figure 1 are as follows:

1. Identifying problems to be verified in the current curriculum
2. Determining how to verify the problems
3. Collecting data
4. Analyzing and interpreting data
5. Making specific recommendations for curriculum revision based on evidence.
- 6.

2.0 Methodology

The qualitative approach was used in this study to explore the views of Grade 2 teacher's experiences of textbooks representation of ideas when introducing the meaning of multiplication and division. This approach was followed because it allowed the researchers to gain insight into the inner experience of participants and make it possible to obtain first-hand information.

2.1 Target population

The target population were all Grade 2 teachers of Primary Mathematics.

2.2 Study population

The study population comprised of two (2) selected primary schools one in Lusaka and the other in Serenje district.

2.3. Sampling procedure

In this research a non-probability sampling technique known as purposive sampling was used for this study to choose two (2) Government primary schools **in Lusaka and Serenje district** respectively.

2.4. Sample size

Two lower primary schools were purposefully chosen in order to get teachers who teach primary mathematics. One teachers was sampled from each of the two schools bringing the total to 2.

2.5 Data Collecting Instruments

The researchers used instruments such as observation guide, semi- structured interview protocol and document analysis scheme. In this study, the video recording of the lesson was also used only as stimuli for the discussions and not part of data analysis.

2.6 Data collection procedure

Data collection instruments such as interview guide, observation scheme and documents analysis were used. The study was conducted in three phases. The first phase was classroom observations, followed by interviews with the selected teachers in order to confirm what they would have seen during observation and the last phase the researchers requested for documents used during mathematics teaching and learning with the aim of confirming what was seen during the observation and heard during interviews. .

2.7 Data analysis

The researchers arranged the cases by each question for all participants in categories/themes/names so as to classify data accordingly as they emerge from the observations, interviews, and document analysis.

2.8 Ethical consideration

Permission to conduct research in Lusaka and Serenje districts was be got from District Board Secretary. Upon visiting the selected schools, permission was also sought from head teachers and the teachers to carry out the proposed investigation respectively. Letters requesting permission were given. Informed consent; participant were informed about the purpose of the research, the interview and transcription process and assured them of confidentiality

Chapter 4 presentation of findings

4.1 Overview

This chapter present findings of the study to determine teachers' experiences of textbooks representation of the introduction of the meaning of multiplication and division at grade2. The research findings were obtained using three types of research instruments during data collections namely lesson observation schedule, semi- structured interview schedules and document analysis checklist. In view of this each of the two grade 2 teachers were studied as individuals case in order to gain an in-depth view of the phenomenon. The individual cases obtained from the three research instruments were compared and constructed with regards to the extent to which each of them introduced the meaning of multiplication and division at the time of the research. The content of the research instrument were analyzed so that the comprehension meaning from the data was obtained. The findings have been presented according to themes that were obtained from the participants as they were trying to answer the research questions. The result relating to participant teachers were presented using the letter A and B. The research questions were presented as follows:

4.2. Research question 1: Are teachers aware of the Methodologies used in textbook when introducing the meaning of multiplication and division?

The information for question one was obtained from classroom observation, semi- structured and document analysis. From the findings the following themes emerged.

4.2.1 Awareness of the methodologies used in textbooks

Result from semi- structured interviews indicted that both teachers of grade 2 were aware of the methodologies used in various textbooks to introduce the meaning of multiplication and division with regards to the revised curriculum. The teachers had this to say in the semi- structured interviews with the researchers:

Researcher: *“are you aware of the methodologies used in textbooks when introducing the meaning of multiplication or division?”*

Teacher A.: “..Ooh. Use the methodology in the learner’s textbook since they do not have teacher’s guide so teacher hope to use what is in the learner’s book exactly. But sometimes through experience teacher use other methods apart from the learner’s books.” “Yes. I am aware that when introducing multiplication to a Grade 2 class, the lesson should always start with equal grouping and repeated addition.”(Teacher B)

From document analysis it was revealed that different authors introduce the meaning of multiplication using multiplication as repeated addition but using different approaches as seen in figure 1 and 2 below

Figure 1: Multiplication as repeated addition with visual aids

Row 1: 6 green circles, $2 + 2 + 2 + 2 + 2 + 2$, magulu asanu ndi cimodzi a ziwiri =

Row 2: 7 pairs of black circles, $2 + 2 + 2 + 2 + 2 + 2 + 2$, magulu asanu ndi ziwiri a ziwiri =

Row 3: 8 triangles of various colors, $2 + 2 + 2 + 2 + 2 + 2 + 2 + 2$, magulu asanu ndi zitatu a ziwiri =

Row 4: 9 pairs of hearts, $2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2$, magulu asanu ndi zinai a ziwiri =

Row 5: 10 pairs of black circles, $2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2$, magulu khumi a ziwiri =

Figure 2: B. Showing a way of writing repeated addition

Repeated addition	Multiplication by 2
2	$1 \times 2 = 2$
$2 + 2$	$2 \times 2 = 4$
$2 + 2 + 2$	$3 \times 2 = \square$
$2 + 2 + 2 + 2$	$4 \times 2 = \square$
$2 + 2 + 2 + 2 + 2$	$5 \times 2 = \square$
$2 + 2 + 2 + 2 + 2 + 2$	$6 \times 2 = \square$
$2 + 2 + 2 + 2 + 2 + 2 + 2$	$7 \times 2 = \square$
$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2$	$8 \times 2 = \square$
$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2$	$9 \times 2 = \square$
$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2$	$10 \times 2 = \square$

Figure 1 and 2: showing how different authors introduce multiplication as repeated addition.

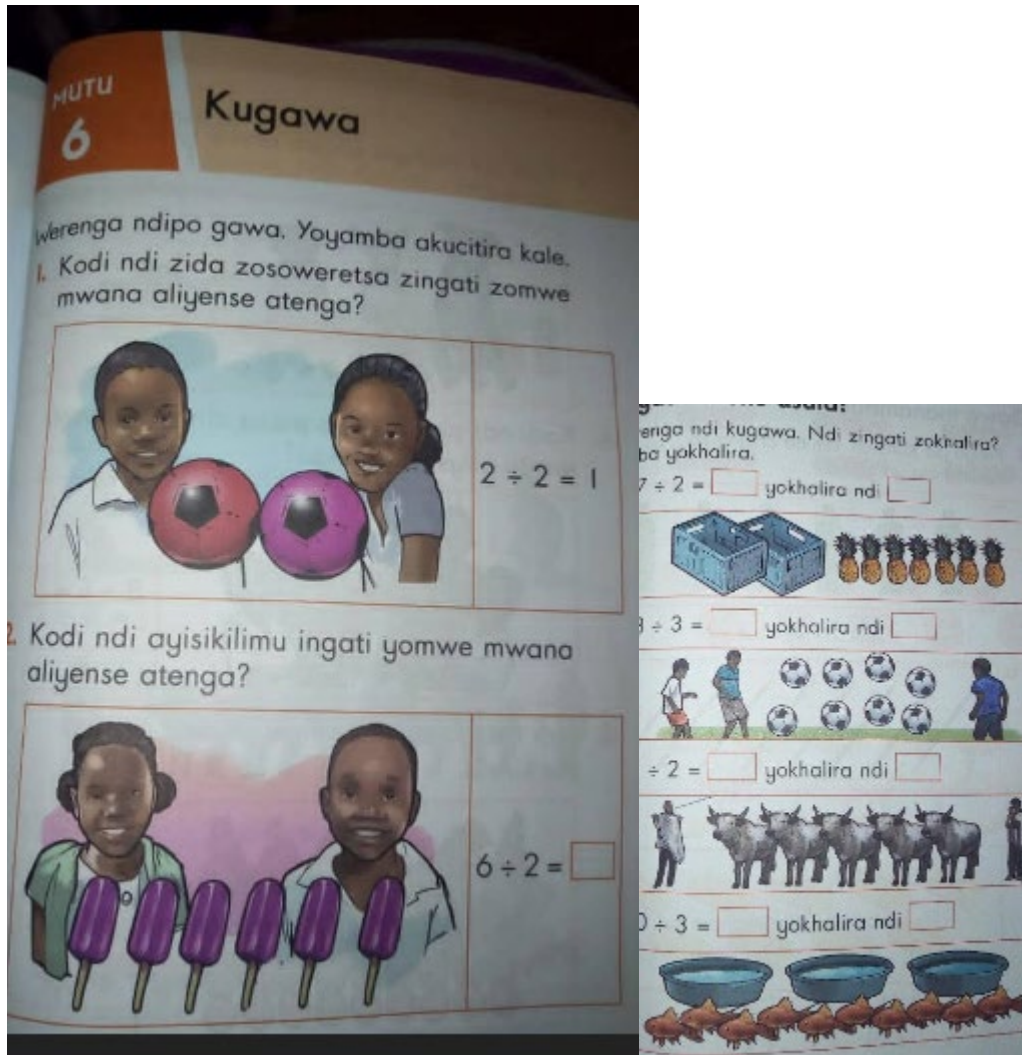


Figure 3 and 4: show how the textbook introduce division as sharing.

4.2.3 Planning a Lesson

Result from semi- structured interview further reviewed that teachers have no teacher's guide to help them plan for lessons. So they entirely depend on the learner's textbook. The following were the responses.

Researcher: are the methodologies used in learner's textbooks similar to what is in the teacher's guide?

"I don't know because I have never seen any of the teacher's guide" (teacher B).

Teacher A: Aaaaa.. Teachers have not seen a teacher's guide so use the learner's textbook. Textbooks do not have teacher's guide. Syllabus is also shallow because it does not show all that

a teacher should cover when you are introduce a lesson. Teacher's guide is needed so that it guides you during planning a lesson and writing a lesson plan. Since teacher's guide is not there you use the learner's textbook or your own methods you have gained during experience.

From document analysis the results show that the teacher B plan lessons using similar methodology as used in the textbook as shown in figure 4 below. It is also observed that the teacher B even included vertical multiplication which is to be done in grade 3.this could be a serious over sight to the teacher.

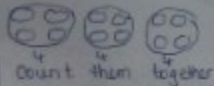
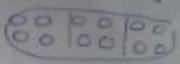
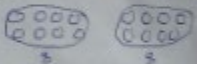
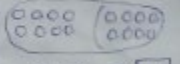
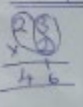

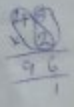
15 min	to demonstrate the activity together with the learners.	$4 \times 3 =$ Count 4 bottle tops in and make 3 groups  Count them together  $4 \times 3 = 12$
stage 2 15 min	Ask the class to demonstrate how to multiply 8×2 using bottle tops. Each learner to perform the activity individually.	8×2 Arrange 8 bottle tops and make 2 groups  Next step Count the bottle tops together  $8 \times 2 = 16$
stage 3 10 min	Teacher to demonstrate multiplication using vertical method with one digit. Ask individual learners to come to the board and multiply to their fellow learners.	<u>Example</u>   

Figure 5: show the lesson plan planned in the similar methodology to that of the textbook

Similarly in another semi-structure interview the two teachers gave the following responses.

Researcher: why do think are the reasons behind using such methodologies in the learner's textbook?

"Mmmmm.. So that when planning for lessons you can compare methodologies used in different learner's textbooks to deepen understand and for variety" (teacher A).. "So that

learning takes place from known to unknown. For example repeated addition is used when learners already have the knowledge of addition.” (Teacher B).

4.3 Research question 2: what are teacher’s experience of the methodologies used in the learner’s textbook during the introduction of multiplication and division.

4.3.1 Teachers’ experience of the methodologies used in textbooks.

Results from semi –structured interview showed that teachers experience different representations of the meaning of multiplication and division in textbooks. The following responses were given

Researcher: *what challenges do you face in the classroom during teaching and learning with regards to methods used in textbooks when introducing the meaning of multiplication and division?*

(Teacher B): *“Multiplication is introduced in different ways in different textbooks. Meaning that in some schools, teachers may not be aware of all the necessary methods needed when introducing multiplication. There are no teachers guides in schools to guide on some of the activities to use when teaching. I completely depend on what is written in the pupils books.*

“Children who did not understand addition have problem since it is repeated addition. For example when counting the number several times. It becomes difficulty to identify the number that represent groups times the number of elements in the set. For example there six groups and in the set there are two, two.” (Teacher A).

4.3.2 Meaning of multiplication as repeated addition and grouping

Results from semi- structured interviews also revealed that teachers find it difficult to understand some of the concepts on equal grouping i.e they can’t differentiate between number which represent groups and that which the number of items in each group between the multiplier and multiplicand. The following responses were given.

Researcher: *What do you understand by the meaning of multiplications (repeated addition and grouping) from the mathematic perspective?*

“Ooooh, counting the same number several times if there are six then times number of object in each group for example in the set there are two, two...(teacher A)”.

Results from classroom observation revealed that teacher A introduced the meaning of multiplication as shown in figure 6 below.

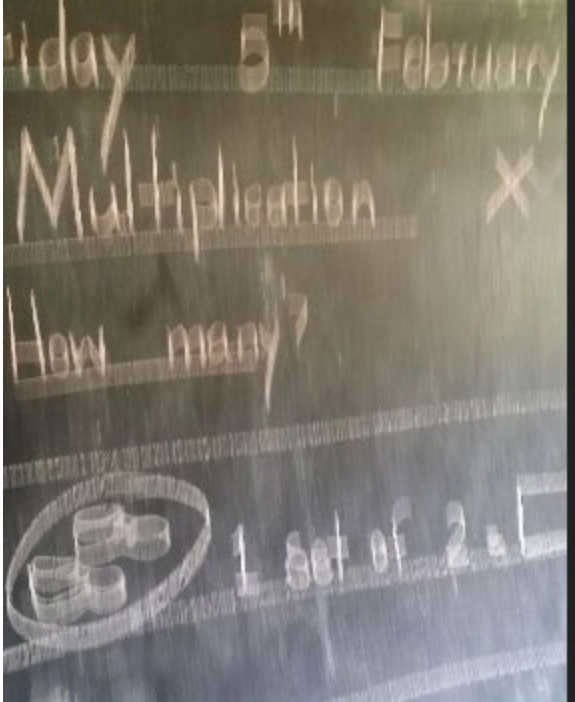


Figure: show introduction of multiplication on the board.

Researcher: What do think is the difference between repeated addition and grouping from mathematical point of view?

(Teacher B) “ I feel grouping always goes on with hands – on – activities while repeated addition can be taught even abstract form at a higher level”. ” repeated addition, there is no use of the symbol”. “Repeated addition takes you to introducing multiplication symbol and groupings where you count the number of sets to give you the number of groupings. Counting the number of objects in the set. Hence 6×2 . Two is the total number of objects in each group.” (Teacher A).

Research results showed that the participants had an idea about the benefit of using repeated addition as the meaning of multiplication. The following responses were indicated during semi- structured interview

Researcher: what are the benefits of using repeated addition as introduction of multiplication and what are the disadvantages of using only repeated addition as the meaning of multiplication.

(Teacher B) “Learners don’t struggle a lot to grasp the concepts because they already have the knowledge on addition. But failure by teachers to identify which number stands for a group and which stands for the number of items between the multiplicand and multiplier may cause

confusion in learners. Without much emphasis, learners may not develop the concepts of multiplication.”

“Learners can give answer in terms of addition. However, since learners have the multiplication table at the back of their exercise books they can check and just copy without understanding how they have found the answer” (teacher A)..

4.3.3 Use of methodologies as they are in the textbook.

Results from semi- structure interviews revealed that teachers use the methodologies as they are in the textbooks. The following responses were recorded.

Researcher: why do you use the methodologies as they are written in the textbook?

“I feel it the best way in which we as teachers can develop the concept of multiplication in our learners by moving from known to unknown” (teacher B).” It becomes easier for the learner to find the answer. It is also easier for the learner to understand because they are able to see the number of objects.” (Teacher A)

4.4 Research question 3: *what are teachers’ perceived problem in the methodologies used in the textbooks when introducing the meaning of multiplication?*

4.4.1 Teachers perceive problem in the methodologies used in textbooks

The findings revealed that teachers have challenges if learners have not understood the concept of addition, they find it a problem to relate it multiplication as repeated addition. During semi-structured interviews the two teachers expressed the following respectively:

Researcher: what problems do you face with regards to the methodologies used in the textbook when introducing the meaning of multiplication and division?

“When you do not emphasize they will go back to addition because they do not understand so emphasize all the time. At all times charts should be on the wall so that they can go through even own their own even when teacher is not there. Children find it difficult to learn abstract. But peer teaching can help, homework should also be done so that parents can help” (teacher A),

“I think a lot teachers use only one method when introducing the meaning of multiplication which is repeated addition which prominent in almost of the textbooks used in most of the schools. At the moment I can say that I have limited activities to use during introduction of the meaning due to lack teacher’s guide.” (Teacher B).

4.4.2 Effect of methodologies used in textbooks to introduce the meaning of multiplication and division.

Results from semi-structured interview for the two participants revealed that the way textbooks represent the meanings of multiplication and division can affect learners positively or negatively. The participants expressed that:

Researcher: How has the methodologies used in the textbook affected the teaching and learning in the classroom?

(Teacher A) "it depends if the methodology used in the textbook is shallow, it can limit you. If the teacher is lazy you cannot go far, you end up using the same that is in the textbook without additional knowledge. If you cannot explore other methodologies from research, it is a challenge". "Teaching and learning has been affected positively as learners move from known to unknown" **(teacher B)**.

Another additional question was asked to the participants to give their views on the most effective way of introducing the meaning of multiplication and division. The following suggestions were given.

Researcher: What do you think will be the most effective way of introducing the meaning of multiplication and division?

"Both your own and textbook methodologies. Children are different they need various ways of representation of the same ideas for example other can draw, others can use counters while other can calculate mentally" (teacher A). First by grouping then followed by repeated addition, because I think it enables learners to develop new knowledge from previous experiences" (teacher B).

The research finding also revealed that translating mathematics into local languages also changed means of mathematics concept. The following views were given during semi-structured interview.

Researcher: Is there anything you would like to say with regards to the methodologies used in the textbook for instance what is taught in the classroom and what is written in the curriculum.

"Using more than one methodology in textbooks so that the teacher can help learner. The curriculum use of local language changes the meaning of most concepts for example multiplication in nyanj is (kuyonkeshu) while in chibemaba is but this mean something else in mathematics. Looking at the error in which we are, teachers' guide should be available not on paper but print more to cater for all teachers. Teacher should have a copy each, if you do not have you end up teaching what you did not plan so that you suit every learner.

When asked if they compare the syllabus and textbook when planning, the teacher said some textbook has information that is not in the syllabus so we compare so that it guides. You. You should put teachers' guide a priority so that other meanings of multiplication and division can be added to aid the teacher during planning. The development of textbook should looked at so that teacher will have a variety of what to use"(teacher A)." think it would be better if all the textbooks used in schools contain the same methodologies though written by different authors".(teacher B).

Chapter 5: Discussion of findings

5.1 Overview

This chapter discusses the findings for the study on teachers' experiences of textbooks representation of the introduction of the meaning of multiplication and division at grade 2. The research findings are discussed according to the research questions.

5.2 Research question 1: Are teachers aware of the Methodologies used in textbook when introducing the meaning of multiplication and division?

5.2.1 Awareness of the methodologies used in textbooks

Result from semi-structured interviews indicated that both teachers of grade 2 were aware of the methodologies used in various textbooks to introduce the meaning of multiplication and division with regards to the revised curriculum. The findings revealed that, teachers use a specific methodology found in a textbook that the particular school purchased as reflected in section (4.2.1, figure 1, 2 and 3). One participant teacher said that teachers use the method in the learner's textbook exactly because they do not have teachers' guide though sometimes through experience teacher use other methods. Another participant also added that she was aware that when introducing the meaning of multiplication the lesson should always start with equal grouping and repeated addition.

From the findings it is evidenced that teachers are aware of what the curriculum require and what is in the textbooks. But the question is are teachers aware of the gaps between the curriculum and the textbook representation of the meanings of multiplication and division. For example the specific outcome in the curriculum under multiplication indicated that express addition as repeated addition. Some textbook developer either write on repeated addition or grouping. The textbook introduce division as sharing as reflected in the syllabus while the difference between divisions as equal set group and repeated subtraction is not addressed. Learners will grow up with understanding that division is only sharing. Sharing as repeated subtraction also does not come out as the textbook only mentions sharing. The translation (kugawa) have several mean in local language that does not mean division in mathematics.

5.2.2 Planning a lesson

Result from semi- structured interview further reviewed that though teachers are aware of different representation of multiplication and division but they have no teacher's guide to help them plan for lessons and write a lesson plan so they entirely depend on the learner's textbook. Teacher's guide can expose teachers to other methodologies that are not in the learner's textbooks. The lack of teachers' guide is another gap between the curriculum and textbook development to help effective implementation of the curriculum at classroom so that the curriculum is attained for the intend purpose. There is need to addressed this gap since it helps teachers to plan for lessons and later write a lesson plan.

5.3. Research question 2: what are teacher's experience of the methodologies used in the learner's textbook during the introduction of multiplication and division.

5.3.1 Teachers' experience of the methodologies used in textbooks.

Results from semi –structured interview showed that teachers experience different representations of the meaning of multiplication and division in the textbooks. As evidenced by section (4,2,1, figure 1,2,and 3). Teachers also has to express their views on what they experience in textbooks and what they teacher in the classroom for instance teacher A indicated that children who did not understand addition have problem since it is repeated addition. For example when counting the number several time it becomes difficulty to identify the number that represent groups times the number of elements in the set. This indicates that the textbooks are not systematically developed to allow the teachers have a smooth delivery in a classroom. This has to do with teacher, content and student as teacher B indicated (see section 4.2.3). The gap is that the curriculum does not give much guidance to textbook developer. The authors decide what to write and this affect teacher who is the implementer and finally the content the student will learn in class.

5.3, 2 meaning of multiplication as repeated addition and grouping

Results from semi- structured interviews also revealed that teachers understand the two concepts equal grouping repeated addition as two means of multiplication differently as evidenced by the response given by teacher B (see section 4.3.2).. This indicated that teacher B has a problem of subject matter which is likely to be a problem for many teachers of primary mathematics since they do not specialize in subjects. In survive training should help teachers to have an understanding of the meaning of the two concepts lesson study.

5.3.3 Use of methodologies as they are in the textbook.

Results from semi- structure interviews revealed that teachers use the methodologies as they are in the textbooks as evidenced by teacher's response in (section 4.2.1.). This attitude indicates that teachers may have problems with the understanding of how the curriculum would be delivered in the classroom as opposed to what is represented in the textbook. The gap here is the content that is given to the learners may not be adequate. More so teachers will have gaps in the way they represent the concept to the learner. Therefore, there is a gap between the intended curriculum, what is implemented and attained by the learners in terms of meaning of multiplication and division.

5.4. Research question 3: *what are teachers' perceived problem in the methodologies used in the textbooks when introducing the meaning of multiplication?*

5.4.1 Teachers' perceive problem in the methodologies used in textbooks

The study revealed that teachers experience problem in the use of methodologies used in the textbooks. Teacher A indicated that if you do not emphasize learners would go back to addition because it becomes difficult to relate multiplication to repeated addition. Teacher B also pointed out that there limited activities in the textbooks to introduce the meaning of multiplication and division. The gap in this case is that curriculum does not guide what methodologies should be used in class and also what methodologies should Authors use to represent the meaning of multiplication and division. For example the teacher can start with concrete objects, then pictorial as reflected in section (4.2.1) figure1,2, and 3). Other representation of multiplication and division should be presenting object in schematic form should and writing a multiplication sentence and division sentence alongside the schematic representation. These stages can help to deepen the understanding of the meaning of multiplication and division before introducing multiplication and division sentences without visual support or abstract.

6.0 Proposition for curriculum revision and suggestion based on the acquired evidence.

Following the findings that were obtained from this study, the following recommendations were given:

6.1 Policy:

The Ministry of General Education (MoGE) has introduced a policy of using familiar local language as a medium of instruction when teaching learners from Early Childhood to grade 4. However, some of the mathematics concepts change meaning when they are translated into local language for example multiplication is translated

as kuyonkesha (increase) and division as kungawa (sharing) in Nyanja. But the translated words mean something else in local language other than multiplication and division of the concept changes when translated. Therefore MoGE should consider to carefully preserve the mathematical concepts.

6.2 Curriculum

6...2.1 Syllabus: In view of the findings, the study recommended that the since the current curriculum emphasize on repeated addition as meaning of multiplication. Repeated subtraction or sharing as meaning of division. There is need for the curriculum to include all the models and give suggestion on the representation of the concepts so the authors can have a conceptual understanding of the two concepts as they write,

Current	Proposition
<p>Multiplication 2.5.1 Express multiplication as repeated addition 2.5.2 Multiply single digit numbers 2.5.3 Memorize the multiplication table of single digit numbers 2.5.4 Use Multiplication vocabulary 2.5.5 Apply Multiplication in real life situations</p> <p>Division 2.6.1 Express division as repeated subtraction or sharing 2.6.2 Use division vocabulary 2.6.3 Divide numbers whose divisor and quotient are single digit. 2.6.4 Apply division in real life Situations.</p>	<p>Develop the meaning of multiplication by presenting multiple equal sets of concrete objects and finding the total number of objects.</p> <p>Develop the meaning of multiplication by presenting multiple equal sets of pictorial objects and finding the total number of objects. Write multiplication sentence for given pictorial representation alongside the pictorial representation.</p> <p>Develop the meaning of multiplication by presenting multiple equal sets of objects in a schematic form and finding the total number of objects. Write multiplication sentences alongside the schematic representations.</p> <p>Develop the meaning of multiplication by writing multiplication sentences in abstract form.</p> <p>Develop the meaning of multiplication with sets consisting of the same number (repeated addition) by drawing a number line.</p> <p>Develop meaning of multiplication as the joining of equal groups (the number in each group is the factor) with an array (the product is the total number of objects in the array).</p> <p>Develop meaning of multiplication using the model of multiplication an area of a rectangle (area model).</p>

	<p>Develop the relationship between multiplication and division</p> <p>Multiply single digit number</p> <p>Develop the facts families starting from multiplication 2- fact., multiplication 10 – facts (using patterns on a 100 chart) multiplication 5- facts(by halving 10 facts and skip counting in 5),multiplication4- facts by doubling 2-facts. Multiplication 3- facts (using patterns of the vertices of a triangle), multiplication 1- fact using real objects, multiplication of 9-fact by subtracting the number being multiplied by 9 from that numbers' 10 facts., multiplication 8-factsbydoubling the 4-facts, develop the multiplication 7-facts as the 6 fact of a number plus on times the number itself.</p> <p>Memorizing multiplication table</p> <p>Can be developed through multiplication and patterns on a hundred chart so no need of memorizing.</p> <p>Multiplication vocabulary</p> <p>Can be developed as learners learn multiplication for example when looking at the array model the row and column and the total number of objects in an array.</p> <p>Apply multiplication in real life situations</p> <p>Express division as repeated subtraction or sharing.</p> <p>Real life situation of where multiplication is used. For example you can give learners multiplication stories and word problems involving what learners see, hear and do at home, at school or at the market.</p> <p>Express division as repeated subtraction or sharing.</p> <p>Develop the meaning of division as equal sharing of real objects and finding out how many objects are in each group..</p> <p>Develop the meaning of division as equal sharing of pictorial objects and finding out how many objects are in each group</p> <p>.Write division sentences for given pictorial representation alongside the pictorial representation.</p>
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	<p>Develop the meaning of division as equal sharing of in schematic form and finding the number of objects per group</p> <p>Write division sentences alongside the schematic representation.</p> <p>Write division sentence in abstract form.</p> <p>The relationship between multiplication and division. Covert division sentence to multiplication sentence with missing factors.</p> <p>. Divide numbers whose divisor and quotient are single digit</p> <p>Use 1-facts to 10 facts to convert division to sentences to multiplication sentence.</p>
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6.2.2 Textbooks: textbook is developed from a syllabus mean that authors write according to specific outcomes and knowledge the syllabus provides for example the representation of the meaning of multiplication there is need for the Authors to include all the models and give suggestion on the representation of the concepts so the teachers can understand present them to learners in a meaningful way.

6.2.3 Textbook publisher: Teachers' guide also should be develop and printed according to the number of teachers in the school so that they help teachers to plan lessons and write appropriate lesson plans.

6.2.4 Book evaluation: evaluation of mathematics books should also be strict so that best textbooks should be chosen and procured to be used in schools especially at primary level.

Appendix 1 Proposed Work Plan and Time Table

S/N	ACTIVITY DETAILS	DATES	DURATION
1	<p>Data collection processing</p> <p>Visited Lusaka and Serenje Education Board Secretary for getting permission to carry out research in one of the primary school in the area. The next step is to visit the selected school for further arrangement with the head and also the teacher. In this research the selected school in Lusaka District is Kabulonga Primary while in Serenje District is Kamwala Primary.</p>	4 th February, 2021	Day 1
2	<p>Visited the school to carry out research. The research was done in three stages.</p> <ul style="list-style-type: none"> • First did classroom observation. • followed by semi- structured interview with the teacher • finally document analysis 	5 th february,2021	day 2
3	Data processing and analysis	8 th -16 th February,,2021	9 days

Appendix 2 JICA ONLINE COURSE RESEARCH PROJECT DRAFT BUDGET FOR ZAMBIA

JICA ONLINE REVISED BUDGET FOR ZAMBIA.

MAIN SURVEY

Activity and Inputs	Qty	Rate
Data collection		
2 vehicles to visit 2 primary schools in Lusaka district of Lusaka Province and Serenje districts of Central Province	2 DAYS	-----
Daily Allowance for 4 people	2 DAYS	-----

Appendix3: Lesson observation for teachers

School code.....

Time

Number of boy..... and Girls.....

Teacher's code.....

item	Elements to observe	observation	comments
1	How textbook is used by teacher in class to present the meaning of multiplication and division		
2	Methodology and representation of the meaning of multiplication and division on the board.		
3	Teacher's conceptual understanding of the content from the textbook		

Appendix4 Structured interviews schedule for teacher

1. Are teachers aware of the methodologies used in textbooks when introducing the meaning of multiplication and division?

Probing questions

(a) What do you know about the methodology used in the textbooks to introduce the meaning of multiplication and division? Explain.

(b) Are the methodologies used similar to what is in the teacher's guide?

(c) Why do you think are the reasons behind using such methodologies in the textbooks? Give reasons.

2. What are teachers' experiences of the methodologies used in textbooks during the introduction of multiplication and division?

Probing questions

(a) What challenges do you face in the classroom during teaching and learning when introducing the meaning of multiplication and division?

(b) What do you understand by the meaning of multiplications (repeated addition and grouping) from the mathematic perspective?

(c) What do think is the difference between repeated addition and grouping from mathematical point of view?

(d) What are the benefits of using repeated addition as introduction of multiplication and what are the disadvantages of using only repeated addition as the meaning of multiplication.

(e) Why do you use the methodologies as they are written in textbooks? Give reason and suggestion.

3. What are teachers' perceived problems in the methodology used in the textbooks when introducing the meaning of multiplication and division?

Probing questions

(a) What problems do you face with regards to the methodologies used in textbooks when introducing the meaning multiplication and division? Explain

(b) How has the methodology used to in the textbooks to introduce Multiplication and division affected the teaching and learning in the classroom?

(c) What do you think will be the most effective way of introducing the meaning of multiplication and division? Why do you think so?

(d) Is there anything you would like to say with regards to the methodologies used in the textbooks, what is taught in the classroom and what is written in the curriculum? Explain.

Thank you for your time.

Appendix 5 : Document Analysis

School code **Grade.....** **Teachers code** **number of learners.....**

	Document analysis	Evidence	comments
1	syllabus		
2	Mathematics textbooks		
3	Lesson plan		
4	Scheme of work		
5	Learners books		

General observation.....