



The Use of Mobile Phones in Improving Continuous Professional Development
Among Teachers in Indonesia

A thesis submitted for the degree of Doctor of Philosophy

By
Mohamad Adning

Department of Education, Brunel University London

2022

Abstract

In light of the omnipresent nature of mobile technology, communities are challenged to rethink the advantages of mobile technologies, in particular within the field of education. When considering the freedom of communication in terms of time, space and subject that mobile technologies provide, governments need to rethink how this ever-present technology can be exploited to enhance teachers' professional development. The central theme of this thesis is the role of mobile phones as a support system for continuous professional development (CPD) in Indonesia's national educational framework. As a developing country, these issues are less researched. In this thesis, the methodology uses a qualitative approach to explore teachers' knowledge as they work in teacher working groups (TWGs), and their use of mobile phones. Twenty teachers participated in this case study by integrating a qualitative data analysis in their design. An in-depth analysis was conducted on seven out of these 20 teachers to examine the deep learning of teachers regarding higher-order thinking skills subjects. Data was collected using semi-structured interviews, observation techniques, along with digital media records to provide detailed portrayals of teachers' mobile phone use during extended periods of CPD. Six themes emerged to support the key questions, which were implemented from the conceptual framework. The results show that mobile phones clearly offer several major affordances for teachers' professional development, particularly within the national framework and in rural areas. While the major elements of the CPD were rolled out nationally through a government internet-based learning platform, individuals and groups found mobile phones to be indispensable in navigating the requirements placed upon them. The findings have implications for education theory and practice since they provide evidence to support the incorporation of mobile phone technology into continuous professional development for teachers. This research contributes novelty into education systems and to the educational community with an increased understanding of the ways mobile phones can affect teachers in being more professional.

Acknowledgements

Bismillah (in the name of God), the most beneficent and the most merciful. My praises and thanks are to Allah, the lord of all existents, for giving me the strength and patience to go through the Ph.D. journey, and peace and blessings are upon his prophet Mohamad.

First I would like to express my deepest appreciation and gratitude to my principal supervisor, Professor Mike Watts for his brilliant supervision throughout my Ph.D. journey; he was supportive in every way possible for making all challenges seem easy and simple to face. I greatly respect his gentle personality; it made me always happy and comfortable to deal with him. Furthermore, I greatly appreciate Dr. Nic Crowe, my second supervisor, for his suggestions and comments throughout this research.

My deepest thanks go to the hidden warriors, my family (Irmayati, Alif Pasha and Dzakiyah Talita Adning), Sufian family and Sultoni family, thank you for your prayers and dua, for encouraging me to study. My beloved wife, thank you for asking me every single day “what was your progress today in your Ph.D.?”, for pushing me to learn harder, for listening to me while I talk for hours about my thesis even though it is not in your field. Foremost, thank you for believing in me. My gratitude extends to all other members of my family for being my backbone, for supporting me through this journey, for looking up to me and for waiting for the day I officially become a PhD holder. Special thanks also go to all staff members my colleagues in the Department of Education, especially Dr Gwen Ineson, Dr. Qurania Filippakou and Kate Hoskins for their assistant and encouragement throughout the research process as capable student to face the Viva. Furthermore, I would like to thank my country, especially for the Minister of education and culture who put me on the government's grants. Lastly, I do like to thank to myself for putting so much effort and pain into this journey, which has been the best thing I have ever done. May God bless and grace me as well as my future carrier, Aamiin.

Contents

Acknowledgements	iii
Chapter 1 Introduction	1
1.1 Research Background	1
1.2 Research Motivation and Researcher Background	11
1.3 Research Aim, Objectives and Questions.....	13
1.4 The Structure of the Thesis.....	14
Chapter 2 Literature Analysis.....	16
2.1 Chapter Outline.....	16
2.2 Context of Indonesia	16
2.3 Education System in Indonesia	18
2.3.1 Period Before the Independent Era.....	18
2.3.2 Independence Period	21
2.4 Professional Teachers in Indonesia	27
2.4.1 The Challenge of a Professional Teacher in Indonesia	30
2.4.2 Continuing Professional Development Model in Indonesia.....	34
2.4.3 Zoning based Learning Competency Improvement Program.....	40
2.4.4 The Performance of Teacher Working Group to Continue Professional Development ...	51
2.4.5 The Utilisation of Mobile Phone in the Teacher Working Group	56
2.5 The Potential of Mobile Phone in Continued Professional Development	60
2.6 The Conceptual Framework Mobile Phone Work into National Framework	64
2.7 Summary	68
Chapter 3 Research Design Overview	69
3.1 Chapter Outline.....	69
3.2 Research Design	69
3.3 Participants.....	74

3.4	Ethical Procedures	79
3.5	Validity and Reliability	80
3.6	Data Collection and Analysis.....	82
3.6.1	Data Collection	82
3.6.2	Qualitative Data Analysis.....	92
3.7	Summary	101

Chapter 4 Case Study Implementation102

4.1	Chapter Outline.....	102
4.2	Location and Infrastructure of the Cigombong District	103
4.3	Teachers' Profile in the Cigombong District	111
4.3.1	The topography of teachers' residence in the Cigombong District	111
4.3.2	The demography of teachers in the Cigombong District	112
4.4	The Utilisation of a Mobile Phone for Teachers in Cigombong.....	116
4.5	The National Training Programme in the Cigombong District	121
4.5.1	Comparisons of the guidance book with the actual implementation of the NTP in the Cigombong District.....	121
4.5.2	Mobile Phone Activities During the Training Programme	125
4.5.3	The National Training Programme in implementing LMS.....	128
4.5.4	The Result of the National Training Programme in the Cigombong District.....	135
4.6	The Dissemination Programme in the 08 Ciadeg Teacher Working Group	139
4.6.1	The Ciadeg Village is Part of Cigombong District.....	139
4.6.2	The Implementation of the Dissemination Programme in the 08 Ciadeg Teacher Working Group in Ciadeg Village	143
4.6.3	Mobile Phone to facilitate Participants in the Dissemination Programme.....	147
4.7	Summary	149

Chapter 5 Analyses and Discussion155

5.1	Chapter Outline.....	155
5.2	Source of Data	156

5.3	Identifying Themes Related to the Use of a Mobile Phone in the NTP at Cigombong District, and the DP at 08 Ciadag TWG	159
5.3.1	<i>“Aha” Condition at the Cigombong District.....</i>	161
5.3.2	<i>Mobile Technology and I are Friends</i>	166
5.3.3	<i>All-round Mobile Phone.....</i>	174
5.3.4	<i>WhatsApp Contribution in National Framework.</i>	187
5.3.5	<i>Surface Learning.....</i>	203
5.3.6	<i>Deep Learning</i>	212
5.4	Discussion	219
5.4.1	Teacher Perception on Using Mobile Phones in Aiding Their Continuous Professional Development.....	220
5.4.2	Mobile Phone Bridges the Gap and Help Overcome the Issues of Geographical Isolation to Overcome the Difficulties Experienced by Teachers on Knowledge of HOTS in the National Framework	225
5.4.3	Knowledge Exchange of Teachers on Knowledge of HOTS in National Framework Indonesia Through Mobile Phone	231
	Chapter 6 Conclusion.....	237
6.1	Chapter Outline.....	237
6.2	Contribution Knowledge	237
6.3	Implications for Policy and Practice	242
6.4	Limitations	248
6.5	Further Research	249
	References	251
	Appendix A	267
	Appendix B	268
	Appendix C	278
	Appendix D	285
	Appendix E.....	286
	Appendix F.....	288

Figures

Figure 2-1	The Map of Indonesia.....	17
Figure 2-2	The Map of Palapa Ring Project.....	17
Figure 2-3	Structure of the Education System in Indonesia	22
Figure 2-4	Flow Chart Management Mechanism in the National Training Programme.....	43
Figure 2-5	Flow Chart Implementation of the National Training Programme.....	44
Figure 2-6	Learning Activities in the National Training Programme	45
Figure 2-7	Steps of Learning Activities in the National Training Programme	46
Figure 2-8	Mobile Phone Framework in the NTP.....	49
Figure 2-9	Framework in the NTP and DP Through Mobile Phone.....	66
Figure 2-10	Framework of Collaboration Teachers in the NTP and DP in TWG Through Mobile Phone.....	67
Figure 3-1	Embedded Case Study Design for this Research.....	73
Figure 4-1	The Topography of the Cigombong District.....	105
Figure 4-2	Cellular Company (Telkomsel) Cover Signal Surrounding the Cigombong District	108
Figure 4-3	Cellular company (Telkomsel) cover signal surrounding the Cibinong District.....	109
Figure 4-4	Word Frequency Results from the FGD	118
Figure 4-5	Participants Actively Utilise the Mobile Phone to Support the Learning Process in the Class.....	126
Figure 4-6	Two Types of Access to the LMS of the NTP.....	128
Figure 4-7	The NTP Learning Management System	129
Figure 4-8	Official Government Website that is the Source of Knowledge and Content of the NTP.....	129

Figure 4-9	Wall Status on WhatsApp	131
Figure 4-10	The Topography of Ciadeg Village	140
Figure 4-11	Cellular Company (Telkomsel) Cover Signal Surrounding the Ciadeg Village	142
Figure 4-12	Learning Activities in the Ciadeg Village	145
Figure 5-1	Word Cloud Result from FGD	169
Figure 5-2	Word Cloud from Chat Group 'PSRTA PKP Ciadeg Cigombong'	177
Figure 5-3	Participants Use a Mobile Phone While They Were Working With a Laptop	180
Figure 5-4	Participants Used a Mobile Phone While They Were Working On a Laptop	182
Figure 5-5	Comparison of Figures Between Individual Posts and Posts about Knowledge and Programme in Chat Group 'PSRTA PKP Ciadeg Cigombong'	190
Figure 5-6	Comparison of Figures Between Individual Posts and Posts about Knowledge and Programme in Chat Group "PKP KKG 08&02"	191
Figure 5-7	Distribution of Individual Posts from Facilitators on Small Working Chat Group in Dissemination Programme at 08 Ciadeg TWG	196
Figure 5-8	Word Cloud for Chat Group 'PSRT PKP Ciadeg Cigombong'	197
Figure 5-9	Word Cloud for Chat Group 'PKP 08&02'	198
Figure 5-10	Word Cloud for Small Working Chat Group 'PKP Ciadeg Group One'	199
Figure 5-11	Word Cloud for Small Working Chat Group 'PKP Ciadeg Group Two'	200
Figure 5-12	Word Cloud for Small Working Chat Group 'PKP Ciadeg Group Three'	200

Figure 5-13	Word Cloud for Small Working Chat Group 'PKP Ciadeg Group Four'	201
Figure 5-14	Word Cloud for Small Working Chat Group 'PKP Ciadeg Group Five'	201
Figure 5-15	Word Cloud for Combination Small Working Chat Group One until Five	202
Figure 5-16	Word Cloud From Chat Group 'Pkp Gugus Ciadeg'	202
Figure 5-17	Activity of Working Group at Home	206
Figure 5-18	Word Cloud from Chat Group 'PSRTA PKP Ciadeg Cigombong'	207
Figure 5-19	Collaboration of Facilitator and Participants in an Out of Session in the DP	217
Figure 5-20	Connectivity of research questions and themes	219

Tables

Table 2-1	The Results of Competency Test for Teacher (CTT) 2015-2017	31
Table 3-1	List of Participants in National Training Programme in the Cigombong District.....	76
Table 3-2	List of Seven Members of 08 Ciadeg TWG who Joined the NTP in the Cigombong District	78
Table 3-3	The Data Collection Methods and Purpose in this Research	83
Tabel 3-4	Boundary and Categories of the Research Analysis.....	94
Tabel 3-5	Sample of Boundary, Cubcategory, Nodes and Codes Made for Rural Area.	95
Table 3-6	Information Analysis of Data from Subcategory and Data Collection Process.....	96
Table 4-1	List of Participants in the National Training Programme in the Cigombong District	103
Table 4-2	WhatsApp Conversation at Chat Group ‘PKP KKG 08&02’.....	132
Table 4-3	Results of Participants at NTP in the Cigombong District.....	137
Table 4-4	List of Seven Members of Ciadeg 08.....	143
Table 4-5	Conversation Chat Facilitator and Core Teacher in Chat Group ‘PKP Gugus Ciadeg’	146
Table 4-6	Facilitators and Core Teachers in Chat Groups ‘PKP Gugus Ciadeg’	148
Table 5-1	List of Participants in the National Training Programme in the Cigombong District	158
Table 5-2	Themes that Appeared During the Research.....	161
Table 5-3	Supporting nodes for ‘Aha’ Condition in the Cigombong District Theme	162
Table 5-4	Data Source for ‘Aha’ condition in the Cigombong District Theme....	162

Table 5-5	Supporting nodes for <i>Mobile Phone and I are Friends</i>	167
Table 5-6	Data Source for <i>Mobile Phone and I are Friends</i>	167
Table 5-7	Results of the Most Frequent Words used from the FGD.....	170
Table 5-8	Boundary and Category for <i>All-Round Mobile Phone</i>	174
Table 5-9	Supporting Codes for <i>All-Round Mobile Phone</i>	174
Table 5-10	Data Source for <i>All-Round Mobile Phone</i>	175
Table 5-11	Conversation on Chat Group ‘PKP KKG 08 & 02’	183
Table 5-12	Boundary and Category for <i>WhatsApp Contribution in National Framework Theme</i>	188
Table 5-13	Supporting Nodes for <i>WhatsApp Contribution in National Framework Theme</i>	189
Table 5-14	Contributions of Individual Posts in Chat Group ‘PSRTA PKP Ciadeg Cigombong’.....	192
Table 5-15	Individual Post in Chat Group ‘PSRTA PKP Ciadeg Cigombong’ in the NTP	193
Table 5-16	Individual Post in Chat Group ‘PKP Gugus Ciadeg’.....	195
Table 5-17	Boundary and Category for <i>Surface Learning Theme</i>	204
Table 5-18	Data Source for <i>Surface Learning Theme</i>	204
Table 5-19	Comparison Between the NTP Result and Number Of Active Participants on WhatsApp Group Chat in the NTP	209
Table 5-20	Boundary and Category for <i>Deep Learning Theme</i>	212
Table 5-21	Data Source for <i>Deep Learning Theme</i>	213

List of Abbreviations

Abbreviation	Full Term
AUSAID	Australian Agency for International Development
CoP	Communities of Practice
CPD	Continue Professional Development
CTT	Competency Test for Teachers
DP	Dissemination Programme
DMR	Digital Media Record
EIA	English in Action
HOTS	High Order Thinking Skill
ICT	Information and Communications Technology
IN	In-Service Training
JICA	Japan International Cooperation Agency
LMS	Learning Management System
MoEC RI	Ministry of Education and Culture Republic Indonesia
NE	National Exam
NEBC	National Exam Based on Computer
NTP	National Training Programme
ON	On Job Training
PCK	Pedagogy Content Knowledge
PLC	Professional Learning Community
PISA	Programme for International Student Assessment (PISA)
PUSDATIN	Central Data and Information MoEC RI
UNESCO	United Nations Educational, Scientific and Cultural Organization

USAID	The United States Agency for International Development
USO	Universal Service Obligation
RQ	Research Question
SGD	School the Front-line use ICT
SPDP	Sustainable Professional Development Programme
TIMSS	Trends in International Mathematics and Science Study
TLP	Teacher Learns Programme
TTP	Teacher Training Programme
TWG	Teacher Working Group
ZEE	Economic Exclusive Zone
ZLCIP	Zoning based Learning Competency Improvement Programme
WEF	World Economic Forum

LIST OF CONFERENCES AND PUBLICATIONS DRAWN FROM THE BODY OF THIS THESIS

Conferences and Doctoral Seminars:

1. Regional symposium education developer learner (instructional design) in Indonesia on 24-26 March 2019. Contribute as speaker “Utilisation Mobile Phone in Teacher Working Group in Lampung province”.
2. 7th Teaching & Education Conference 2019 in London created by The International Institute of Social and Economic Sciences (IIES) on 22-24 May 2019, and contribute as speaker “Teacher Perception Using The Mobile Phone In The Teacher Working Group; Age Matters”, and included the proceeding paper
<https://EconPapers.repec.org/RePEc:sek:itepro:8411320>
3. University of Brighton’s Second Education Research and Enterprise Conference on 14 June 2019, as speaker “The Impact of the Mobile Phone to Improve Teacher Competence Through Teacher Working Group to be a Professional Teacher in Indonesia”.
4. The British Education Studies Association (BESA) conference at the University of Wales Trinity St David, 27th – 28th June 2019, as speaker “The Potential of Selected Mobile Phone Apps to Improve Continued Professional Development Through Teacher Working Groups in Indonesia”.
5. Staff and students Brunel University conference, Friday 24th July 2020, as speaker ‘Using Mobile Technology for Teachers’ Professional Development in Indonesia’, and contributed in proceeding paper.
https://brunel.figshare.com/articles/conference_contribution/Brunel_University_London_Education_Department_Conference_Proceedings_2020/13270133

6. Staff and students Brunel University conference, Wednesday 28th July 2021, as speaker 'The Use of Content Analysis for Research in the Education Field', and contributed in proceeding paper,
7. The British Educational Research Association (BERA) conference, 13th-17th September 2021, as speaker 'The Used of Mobile Phone in Supporting Teachers' CPD in an Unexpected Situation'

Book Chapters:

1. Adning, Mohamad, Chapter, Mobile Phones and Teachers' Professional Development in Rural Indonesia'. In Watts, M, Mobile Learning: From Pedagogy to Practice, Cambridge, Cambridge Scholars Publishing (in process publish).
2. Adning, Mohamad, (2021), Mobile Phone and I are Friends, In Watts, M, Educational Prodigies: One Voice, representing Many, Brunel Universtiy London. UK.

Chapter 1

Introduction

1.1 Research Background

Mobile learning is an emerging and rapidly expanding field in educational research and practice across formal and non-formal education (McAleavy et al., 2018). This has been shown through many projects that combined mobile learning with more ambitious or immersive infrastructures, whether in classrooms or the wider environment, to support learning (Motteram, 2017; Clarke and Svanaes, 2015; Picton, 2019). Moreover, several countries have deployed large scale mobile learning schemes in recent years, often as a part of an initiative to make education more up-to-date and relevant in the 21st century. Efforts have been made in the United Kingdom, Malaysia, India, Lebanon, Finland, the Netherlands, France, Northern Ireland, Scotland, Jamaica, and Columbia (Clarke and Svanaes, 2015). However, this is not without its challenges, and in many countries, including the United States, Turkey, Thailand, South Africa, and Indonesia, such schemes have been delayed or even abandoned (Warsihna et al., 2015). For example, in Indonesia, the Indonesian Government, through the Ministry of Education and Culture Republic Indonesia (MoEC RI), has initiated mobile learning through mobile phones and computer tablets as early as 2011, but it was only realised in 2015 (Warsihna et al., 2015). The delay was due to several reasons, such as regulation support, infrastructure, finance, and content development (Chung et al., 2019; Heflin et al., 2017; O'Bannon and Thomas, 2014).

There is a strong indication that mobile learning can contribute to the education field. Clarke and Svanaes (2015) pointed out evidence that mobile learning can provide the tools for specific learning styles such as learning from an expert, collaborative learning, learning through inquiry, and project-based learning. Some experts supported the idea that applying mobile technology devices through mobile learning encourages engagement, motivation, and productivity for learning (Ilic, 2013; Kearney et al., 2015). Moreover, McAleavy et al. (2018) argued that mobile learning offers enormous potential to enhance teachers' professional development, focusing on practicality, specificity, and continuity. Baran (2014) supported that mobile learning provides

flexibility for teachers and the potential for collaborative, contextualised, customised, and personalised learning opportunities. Furthermore, mobile learning allows teachers to share resources, reflect on their practice through questions and share experiences with others, develop new understandings through articulating their experiences, and collaborate in creating artefacts for teaching and learning purposes (Prestridge, 2019). This is in line with UNESCO's recommendations that mobile learning should be integrated into mainstream teacher credentialing programmes and included in a pillar of professional development efforts (Miao et al., 2017).

Nowadays, mobile learning happens predominantly through the use of a mobile phone. This technology is one of the categories of mobile learning that many experts defined as a learning process mediated by handheld devices such as smartphones, tablet computers, and game consoles (Rashid et al., 2020). Meanwhile, smartphones are defined as a mobile phone that offers capabilities similar to the functionality of personal computers, where applications supported by 3G and 4G capacity can be downloaded to allow people to be connected worldwide through a high-speed data connection, thus enhancing productivity (Rashid et al., 2020). In addition, mobile phones are the most ubiquitous interactive Information and Communications Technology (ICT) device in the world and are used by a huge number of people worldwide (APJII, 2018; Howlett and Waemusa, 2018). For instance, in Indonesia, 50.08% of people have a mobile phone (APJII, 2018). At present, for educational purposes, the features, functions, and services provided by a mobile phone can be further enhanced, and it has become a common tool for multi-purpose learning, escalating the transformation of the education world (Baishya and Maheshwari, 2020; Howlett and Waemusa, 2018; McAleavy et al., 2018; Motteram, 2017; Motteram et al., 2020). These conditions have led to an increasing number of studies investigating the role of mobile phones in the field of education (McAleavy et al., 2018).

In addition, the mobile phone has become necessary for teachers to interact professionally with people (students or colleagues). UNESCO reports that many teachers in developing countries have mobile phones (Miao et al., 2017). The interaction of teachers happens both within and beyond one's school regardless of time and location to access educational resources (Ally and Prieto-Blázquez, 2014). For example, professional discussions among colleagues to share hints and tips

(Picton, 2019), consulting sessions among colleagues in group chats regarding teaching knowledge (Adning et al., 2019), reviewing supporting research with an expert (O'Bannon and Thomas, 2014), and accessing expertise outside of their usual range (Aubusson et al., 2009).

However, there are currently only a few studies on the use of mobile phones in continuous teacher professional development as part of developing professional development. McAleavy et al. (2018) and Miao et al. (2017) noted that a few studies have demonstrated that mobile phones support teachers' professional development in challenging contexts such as developing countries. For instance, a recent study was conducted in the Zataari refugee camp in Jordan to support the development of language teachers (Motteram et al., 2020). This study suggested that mobile phones can be used within any teacher education where access to training or education might be curtailed for several reasons (Motteram et al., 2020). Another example within a large-scale programme was explored by UNESCO, studying the use of mobile phones to support teachers' professional development in developing countries to answer the challenges in achieving the UN's fourth Sustainable Development Goal, which is to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (McAleavy et al., 2018; Miao et al., 2017). This project helped in-service primary school teachers in four countries who have limited access to professional development (McAleavy et al., 2018). The research was conducted to study the use of mobile phones for teachers' professional development where most of the researchers focused on teachers' perceptions and experiences rather than the actual exchanges within the group or community (McAleavy et al., 2018).

Furthermore, Motteram et al. (2020) argued that the majority of the analyses of research on teachers' mobile phone use focused on understanding participants' perceptions of the intervention impact and changes in their technology skills, the frequency of mobile phone use, attitudes towards using technology for teaching and learning, and pedagogical knowledge and practices, rather than focusing on actual knowledge exchanges within groups. Very little evidence suggests that teacher development via mobile phones was possible, desirable or effective (Miao et al., 2017). Moreover, Baran (2014) maintained that only a few studies explored the potential of mobile technologies for teachers' professional development, seen in

challenging contexts, including the most recent changes enforced by global events and demographic situations. Motteram et al. (2020) recommended more future studies to examine how teacher development might happen over a longer time period and how teacher participation develops and changes over time, as well as find a scope to explore the potential of groups in the collaboration and production of contextually appropriate materials, teacher knowledge development, and sharing, exploring and addressing issues and problems that arise in that context. Thus, this research focuses on mobile phones in developing countries for knowledge exchange in a challenging context in response to this gap.

Indonesia is one of many developing countries. At present, the population in Indonesia is 258,705 million people distributed throughout 34 provinces, 7,145 districts, and 82,395 villages within 17,200 islands. Even though the number of villages is great, the population prediction shows that over half of the population (53.3%) lives in cities and their immediate surroundings (Indonesia, 2017). Nowadays, Indonesia has seen an exponential increase in teachers over the last decade. The current number of teachers in Indonesia has reached 3,337,914 (Statistik, 2021). The nation needs to equip teachers with academic qualifications, competencies, professional certificates, a healthy body and spirit, and the ability to embody the drive for national education achievement (National, 2005).

Furthermore, the national constitution mandates the continued professional development (CPD) of the teaching profession (Al Rasyid, 2017). Kemendikbud (2018) stated that professional teachers are vital to quality education because learning processes are at the core of education, and student learning depends on the quality of professional teachers. Therefore, teachers have a duty to renew and improve their competencies to enhance the quality of education and as an essential part of long-life learning for professional development (Herliani and Heryati, 2017).

However, the Indonesian government rates teachers' pedagogical and professional competence to be substandard. This situation was shown from the competency test for teachers (CTT) in 2012, with an average score of 47 points in pedagogy and professional competence (DPR RI, 2016). The test examined teachers through 22 essential indicators on pedagogy competence and 59 indicators on professional

competence (Bakri and Sabar 2015). Results from the competency test in 2012 illustrate that there is one pedagogic indicator at the lowest level and twelve indicators at the low levels, while the professional indicator has one indicator at a very low level and 25 indicators at the low levels (Bakri and Sabar 2015). It was suggested from other research in several schools in various provinces in 2013 and 2015, which revealed that teachers are less creative in designing scientific learning that is student-centred and lack pedagogical training to improve the mastery of knowledge concepts (Bakri and Sabar 2015). Nevertheless, there was an increasing score on average in 2015, around 56,69 points (DPR RI, 2016). In addition, the Indonesian government intended to increase the scoring average by 70 points in 2018 (Kemendikbud, 2018).

Therefore, the Government of Indonesia prioritised improving professional teachers in the education system and understanding the role of professional teachers in ensuring quality education (Kemendikbud, 2016a). Concerning this, the government, through the Ministry of Education and Culture Republic Indonesia (MoEC RI), developed various programmes for teachers' continued professional development for all levels of teachers, both certified and uncertified, by empowering various formal and non-formal community-based local institutions, non-governmental organisations, and bilateral relations with other countries (Kemendikbud, 2017, 2018). Moreover, this priority attempts to respond to the challenging programme mandated from the UN's Sustainable Development Goal, which includes seventeen goals, among which quality education to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (Kemendikbud, 2017, 2018). As a result, the government incorporated CPD into the national framework. This framework is in conjunction with a national training programme, community-based, or a combination of both (Al Rasyid, 2017; Kemendikbud, 2018; Murniati et al., 2019). The latest CPD in the national training programmes is the Zoning-based Learning Competency Improvement Programme (ZLCIP), a national training programme combined with empowering a teacher working group (TWG) and is part of the response to the challenging programme from the UN's fourth Sustainable Development Goal (Kemendikbud, 2018; Lisdiana et al., 2018; Susilowati et al., 2019).

Furthermore, the MoEC RI continuously develops national training programmes for CPD. From 2015 until 2019, around five national training programmes (NTP) were

developed: the Teacher Learning Competency Improvement Programme (TLCIP) in 2015; the Teacher Learns Programme (TLP) in 2016; the Sustainable Professional Development Programme (SPDP) in 2017; the Teacher Training Programme (TTP) in 2018, and the latest in 2019 being the Zoning-based Learning Competency Improvement Programme (ZLCIP), which was initially developed in Bahasa and known as Program Peningkatan Kompetensi Pembelajaran Berbasis Zonasi (Kemendikbud, 2018; Lisdiana et al., 2018; Susilowati et al., 2019). Each national training programme has a specific purpose for teacher development, and all national training programmes share the general purpose of improving pedagogies and professionalism in teachers and part of CPD. For instance, the TLP was a massive programme involving 427,189 teachers, or 15.82 per cent of the population of teachers in Indonesia, over many stages of teaching (Kemendikbud, 2018). This programme aimed to improve the pedagogy and professional aspects of teachers' abilities, attitudes, and skills. The aim was to increase the average scores in the national teacher assessment competencies (Kemendikbud, 2018). This programme implemented three strategies consisting of (i) fully online courses, (ii) face to face classes, and/or (iii) a mix of both (Kemendikbud, 2016a). The teacher training modules and strategies for learning were designed to tackle teacher weaknesses by involving institutions under MoEC RI to improve teacher competencies (Awaluddin, 2018; Kemendikbud, 2016a).

However, this program was insufficient as teacher participation in TLP did not describe the whole teacher population, instead only providing a glimpse of the facilities provided to teachers in the CPD training programmes (Kemendikbud, 2018). Therefore, in 2017, TLP was carried out through the Sustainable Professional Development Programme (SPDP) (Herliani and Heryati, 2017). This programme reviewed and revised previous programmes, emphasising the subject matter, character building and assessment based on the class and previous subject matter (Herliani and Heryati, 2017; Susilowati et al., 2019). Both training programmes were directed specifically at increasing the average score of national teacher assessment competencies in 2017, according to various pieces of research and the MoEC RI report (Awaluddin, 2018; Kemendikbud, 2018). Furthermore, the MoEC RI produces a comprehensive annual report every five years on implementing national training programmes for teacher development to give performance indicators for teacher development in Indonesia (Susilowati et al., 2019).

Even though this is a normative report, it provides information on what the government has been doing in terms of teachers' professional development in support of the education system in Indonesia.

The second data from independent researchers examined how the national training programme was conducted to drive the main goals and purposes under specific conditions and in certain areas. Although most research in the TLP and SPDP focused on the assessment and effectiveness of the programme for teachers rather than research in technology usage in support of continued teacher professional development, some research recommended that mobile technology be used in both programmes (Awaluddin, 2018; Djaja, 2017). This recommendation is supported by policies in several countries in implementing technology in CPD in several programmes. For example, in the UK, iPads have been used in CPD in several school locations (Beauchamp et al., 2015; Fenton, 2017). The biggest project integrating CPD with technology was held in Bangladesh, where it helped improve English teachers through English in Action (EIA) for 75,000 teachers until the year 2017 (Walsh et al., 2014).

On top of that, the training programmes in 2016 and 2017 were carried out alongside another training programme until 2019 with different strategies, purposes, approaches, and methods (Kemendikbud, 2018; Lisdiana et al., 2018). The latest national training programme is the ZLCIP. This programme is currently being prepared and conducted during this study; thus, the ongoing assessment, evaluation, and research are unknown. Meanwhile, the national training programme's method and strategy are discussed in Chapter 2 (Subsection 2.4.3 on page 40). Therefore, the opportunity of research on continued teacher professional development is open in the ZLCIP, in which mobile phones in assisting teachers in the process of CPD can be studied.

Interestingly, community-based activities have been used for teacher continuing professional development in Indonesia. For over a decade, the Indonesian government has built national frameworks to achieve the goal of teachers' professional development in Indonesia through community-based collaboration. One national framework that already exists to assist teachers in CPD is named 'Kelompok Kerja

Guru' (Teacher Working Group (TWG)) for primary school teachers. The TWG is a teacher's community with a specific subject and grade level in one area or zone (Al Rasyid, 2017; Murniati et al., 2019). These TWGs have been recognised as one of the strategies that teachers can use to improve their level of competencies, and they are part of the activities in teachers' professional development (Ragatz et al., 2015). Al Rasyid (2017) described that the teacher working groups held different learning and experience in continuing professional development activities, especially to create local workshops, training, and seminars compared to the traditional programme. For instance, one of the TWGs in Ciadeg Village have routine activities such as counselling and disseminating activities to support the learning process and teacher development - some of these activities are voluntary without budget allocation from the government (Saefudin, 2019).

Furthermore, those communities responded to the challenge of achieving the UN's fourth Sustainable Development Goal to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". Resmini (2010) recognised the importance of the TWG as an integral part of the education counselling system where teachers can receive proper aid in improving the quality of their work, and subsequently, enhancing their skills as professional teachers. For example, the Education Quality Assurance Council in Lampung Province recommended that the TWG facilitate teachers in improving their qualifications and skills as a response to the low teacher competency scores compared to the national rate (Resmini, 2010). Therefore, the TWG is one alternative national framework based on a social community approved by the Indonesian Government, and it aims to enhance the competencies and skills of professional teachers (Lampung, 2017). The critical thinking about such communities is exposed in detail in Chapter 2 (Subsection 2.4.4 on page 51).

In essence, the Government of Indonesia hopes that the TWGs would enhance teachers' competencies, and the government has set several aims through the establishment of TWGs (Sunandar et al., 2008). The primary objective is to provide more understanding and knowledge in numerous fields, especially to master the substance of subject material, create good lesson plans, develop learning materials, strategies, and methods, maximising existing equipment and facilities, utilising

learning resources, and give feedback to the group members (Berge and Muilenburg, 2013). It is evident that there are benefits from the knowledge exchange between members, where knowledge is viewed as a state of mind and beliefs, as an object or process to guide future actions or to maintain current abilities, and as a set of boundaries to understand information and to determine what information is needed to make a decision (Laal, 2011). Moreover, Lisdiana et al. (2018) explained that knowledge starts by putting information into context through diverse sources such as documents, databases, and other people. It is then transformed into knowledge or actionable information when combined with the experiences and judgments of the information recipient.

As mentioned earlier in this chapter, the Government of Indonesia prioritised improving professional teachers in the education system by creating several national training programmes. One of them is the Zoning-based Learning Competency Improvement Programme (ZLCIP). The government empowers the teacher community by conducting the Zoning-based Learning Competency Improvement Programme. This programme is known as the National Training Programme (NTP) and is investigated in the next chapter (Subsection 2.4.3 on page 40). The NTP plans to involve hundreds of teachers from any level in school to improve the knowledge of the Higher-Order Thinking Skills (HOTS) approach. In a nutshell, this programme aims to improve teachers' competencies through coaching teachers from designing lessons to conducting the evaluation process using the HOTS approach. This is not without reason; Retnawati et al. (2018) reported that Indonesian teachers' knowledge of HOTS is inadequate, and they cannot clearly explain HOTS with specific ideas. Many teachers are confused between what constitutes HOTS and their specific strategies or learning methods (Rapih and Sutaryadi, 2018; Retnawati et al., 2018). Rapih and Sutaryadi (2018) described that among their subjects, teachers with over ten years of teaching experience claimed that they understood the concept of HOTS and mostly implemented HOTS. However, they faced problems in designing, implementing, and delivering the learning materials. In contrast, the young teachers claimed that they understood conceptual knowledge but could not properly explain the operational knowledge (Rapih and Sutaryadi, 2018). It can be concluded that teachers experienced these difficulties in understanding knowledge, particularly the HOTS

approach. Therefore, the government believes that the NTP is one of the strategies to accelerate the development in the education field, quality, and system through the TWGs, particularly in teacher knowledge, which refers to HOTS knowledge as the topic of learning for the teachers.

To summarise, the MoEC RI showed commitment in developing teacher professionalism. The training programmes were implemented and continually developed to support continued teacher professional development in a national framework to achieve the United Nations' fourth Sustainable Development Goal. Even though each training programme has a specific purpose and target, the teachers' CPD needs are to achieve and/or improve their competence above the professional competency standard of teachers based on Indonesia's teacher and lecture law (Ragatz et al., 2015). Furthermore, only a few studies that involved mobile technology supported continued teacher professional development in Indonesia (Awaluddin, 2018; Djaja, 2017). Thus, there is an opportunity for a study to contribute in supporting CPD in Indonesia by examining the use of mobile technology to assist teachers in achieving inclusive and equitable quality education and promote lifelong learning opportunities for all, as mandated by the Indonesian constitution and the UN.

1.2 Research Motivation and Researcher Background

This research is likely to contribute to the education field by providing a critical perspective to the literature review on education theory and the Indonesian education system. Theory plays a critical part in this research, highlighted by many different theories and theoretical orientations supporting the conduct of this study, such as the theoretical mobile technology, CPD, and Indonesia's education systems. According to Biesta et al. (2014), the conduct of education research plays an important role in research, and again, many would highlight different theories and theoretical orientations to conduct educational research. Furthermore, this study makes any exploration of the role of theory in educational research complex by navigating different and potentially conflicting disciplinary perspectives and agendas, while keeping an eye on how this theoretical multiplicity relates to and matters for the education field. Chapter 2 explores this, and Chapters 4 and 5 continue the discussion. Moreover, the study explored the role of theory to engage with how the theories form a range of different disciplines in education research and focus on what it means for particular theories to be used or applied within the context of this research. Biesta et al. (2014) argued that education research refers to the theory in question and its theory and theorising. Thus, this study not only comes up with the research questions but also answers theories to be used or applied within educational research.

There are obvious links between harnessing mobile phones in daily activities and supporting work in the education field (Baran, 2014; McAleavy et al., 2018; Motteram et al., 2020). For example, in Indonesia, within education, most people would use a mobile phone to read articles, watch tutorial videos, share articles, take an online course, and perform school administration duties (APJII, 2018). As mentioned previously, many studies and research studied the utilisation of mobile phones, whether in classrooms or the wider environment, to bolster learning. However, the study of mobile phone use in the professional development of teachers is limited and even rarer in the research of the use of mobile phones during actual exchanges of knowledge within the group or community. Limited studies were found in the challenging context for teachers' professional development amidst the changes in the global and education system (Motteram et al., 2020). The latest study connected to

this subject was held in a refugee area; a study at the Zataari refugee camp to support the development of language teachers (Motteram et al., 2020).

Besides, Miao et al. (2017) recommended that mobile phones have the potential to be applied to any teacher education to support continued teachers' professional development in developing countries, where access to training or education might be curtailed for certain reasons. In response to that recommendation, this study is motivated to respond to that challenge through a case study in Indonesia, a developing country. Indonesia is an archipelagic country with several topographies and demographics such as coastal, mountainous regions, and valleys, with many villages and islands (Hadiyat, 2014). At present, the communication infrastructure in Indonesia is still uneven, but the number of people using mobile phones and internet penetration is increasing every year (APJII, 2018). Furthermore, Indonesia has significant potential teachers mandated by the government to boost their professional development (National, 2005). Therefore, this study explores the role mobile phones play in knowledge exchange to support teachers' professional development in the context of the community group (TWG) in a complex environment (rural area) in Indonesia.

In addition, the institution where the researcher is currently working, viz. the Ministry of Education and Culture, Republic of Indonesia (MoEC RI), holds a national training programme for studies in education. As a civil servant in the Ministry of Education, the researcher has access to post-graduate studies through this programme. The researcher has used this opportunity to implement the conceptual framework that is outlined in this research to combine the CPD programme with mobile technology in one geographical region in Indonesia. Teacher knowledge of the use of mobile phone technology for continued professional development in a particular area under uncontrolled conditions has been studied by the researcher. The researcher is independent of the MoEC and the research was done without intervention from the MoEC. Moreover, there is no intent to evaluate the government programme or disrupt the programme itself. The researcher is independent and has looked with a critical perspective at teacher knowledge in the use of mobile technology as a contributor to the field of education.

The researcher's motivation is to bring a unique contribution to the field of education. This contribution is aimed at teacher professional development within the constraints of the geographical issue (lack of resources and opportunities for development) to overcome the difficulties experienced by teachers in acquiring knowledge within the national framework by means of assistance through mobile phones. A secondary motivation is the examination of how teacher knowledge is advanced so as to create surface and deep learning through mobile phone technology rather than focusing on an exploration of equity and inclusivity of teachers. At the conclusion of this study, a conceptual framework is proposed for improving professional teacher performance outcomes through surface and deep learning via mobile phones in rural areas, and contextual situations in the framing of the national programme are explored.

1.3 Research Aim, Objectives and Questions

Building on arguments presented in this chapter, the main aim of this study is to contribute to the growing body of research by exploring mobile phone potential for teachers' professional development in knowledge exchange in TWGs in the context of Indonesia as a developing country. It also aims to develop and empirically explore a relevant theoretical framework to better understand mobile phone potential in TWGs in rural areas with geographical and contextual issues. The following objectives were established to address the stated aims of this research, where the systematic research question should be easy to understand and organise by following questions from the perceptions of teachers in understanding mobile phones in aiding their continuous professional development, the challenging demography of Indonesia, and exploring knowledge exchange between teachers through mobile phones.

1. To explore the perceptions of TWG members concerning the use of mobile phones in aiding their continuous professional development.
2. To illustrate how mobile phones bridge the gap and help overcome issues of geographical isolation (a lack of resources and development opportunities) to overcome the difficulties experienced by teachers' knowledge in the national framework.

3. To explore teachers' knowledge exchange in Indonesia's national framework through mobile phones.

The research objectives formed the following research questions (RQ) for this study. The main research question is "How do mobile phones contribute to the continuous professional development of teacher working group (TWG) members in Indonesia to acquire knowledge particularly in the higher-order thinking skills approach?". In detail, the sub-research questions are:

1. What are the perceptions of TWG members concerning the use of mobile phones in aiding their continuous professional development?
2. How can mobile phones bridge the gap and help overcome issues of geographical isolation in order to overcome difficulties experienced by teachers' development of knowledge within Indonesia's national framework?
3. How do mobile phones facilitate knowledge exchange by teachers concerning knowledge within Indonesia's national framework?

1.4 The Structure of the Thesis

This thesis is structured around six chapters, of which this is the first. Chapter 2 provides a critical review of the condition of Indonesia by presenting the literature around the demography, geography, and infrastructure in the country. This chapter also explores the histories of the education system in Indonesia (before and after periods of independence) and provides a critical analysis of professional teachers in Indonesia (issues and challenges), including the use of mobile technology in the education field, as well as the conceptual understanding of the core practices that founded this study.

Chapter 3 provides a detailed description of the research approach employed for this research and explains the rationale behind the research methodologies used, including the selection of the participants, ethical procedure, and timeline of this research. In addition, Chapter 3 explores the data collection techniques deployed, namely semi-structured interviews, observation forms, focus group discussions, and

digital media records, as well as methods of analysing data that use a content analysis approach to analyse data in this research.

Chapter 4 is devoted to describing the actual implementation of the national framework in a rural context for teachers as part of CPD. Furthermore, the exploration would compare the execution of the national framework with the document policy from the Indonesian government. The report is divided into two main activities, namely exploring the NTP and dissemination activities in TWGs.

Chapter 5 presents the analysis and discussion. This chapter starts by exploring the source of data. Several themes are explored during this chapter, discussing and criticising the findings in light of a large body of literature. Therefore, the chapter addresses the primary research question by utilising the themes and analysing them using pro and con references to support the conceptual framework.

Chapter 6 concludes the thesis by discussing the contribution of this research to theory and practice in the education field and mobile technology. In addition, the implication of the findings concerning mobile technology on teacher development in rural areas and policymakers are discussed in this chapter. The chapter ends by identifying research limitations and possible research for future study.

Chapter 2

Literature Analysis

2.1 Chapter Outline

This chapter provides critical literature on the education system in a developing country, Indonesia. In addition, the critical review focuses on the relevant issues regarding situations and conditions in the education system in Indonesia and mobile technology. Chapter 2 is divided into four main sections. The first to third sections focus on reviewing literature on the education system in Indonesia. The fourth section talks about the essential part of framework theory based within the flow theory in teacher working groups and potential signature pedagogy through mobile learning in the national framework, including the current research in mobile learning to support CPD.

2.2 Context of Indonesia

Indonesia is the biggest archipelago country with more than 13,000 islands with a topography of mountains and valleys (Hadiyat, 2014). Indonesia has 5.9 million square maritime areas with 3.2 million territorial waters and 2.7 kilometres square of Economic Exclusive Zone (ZEE), not including the continental shelf (Lasabuda, 2013), as shown in Figure 2-1. Furthermore, Indonesia is endowed with tremendous geographical diversity, diverse populations, various cultures, and local resources (Rahman, 2019). For example, there are 250 local ethnicities, with the majority being of Javanese ethnicity (Dokhi et al., 2016). At present, the population in Indonesia is 258,705,000, distributed among 34 provinces, 7,145 districts and 82,395 villages within the 17,200 islands (B.-S. Indonesia, 2017).

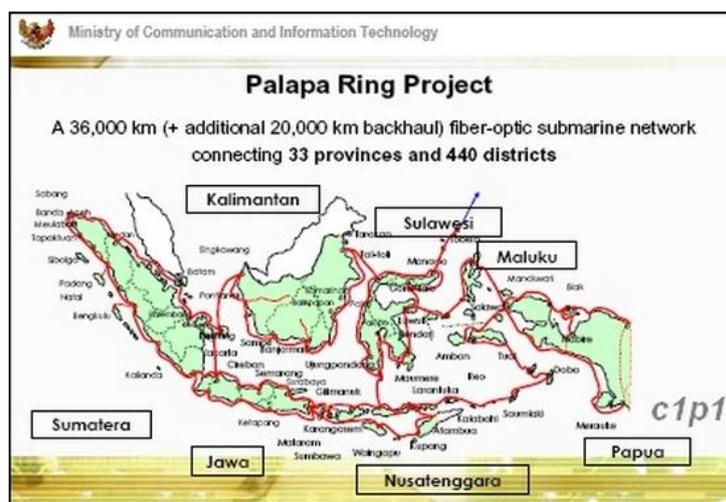
Nowadays, the government of Indonesia uses infrastructure as a motor of national development, enhancing connectivity within the region islands in Indonesia (Lestari, 2019). Prasetyo and Firdaus (2009) defined infrastructure as physical facilities required by public agents for government functions, such as supplying water, electricity, communication, waste disposal, and transportation to facilitate economic and social goals. Moreover, the availability of an adequate physical infrastructure that

supports community economic activities helps the flow distribution in the production of goods and services (Susantono, 2012). Therefore, communication infrastructure has been developed by the Government of Indonesia (Patty, 2018). For example, the government of Indonesia has a project named the Palapa Ring Project (Figure 2-2) that aims to lay 4,700 kilometres of undersea fibre-optic cable as the backbone for the nation’s telecommunications system (Faizal, 2016). The Government of Indonesia has targeted all districts in Indonesia to have 4G connection in 2019 (Julianto, 2018). The APJJI report in 2018 found that internet users in Indonesia have reached 146 million people.

Figure 2-1 The Map of Indonesia



Figure 2-2 The Map of Palapa Ring Project



However, the developed infrastructure is not yet adequate, especially the communication infrastructure (Hadiyat, 2014). There are many groups of islands still untouched by communication infrastructure. Furthermore, Hidayat (2014) described disparities in digital communication in Indonesia between West Indonesia and East Indonesia, and between the urban and village areas. For example, the data showed that 72.4 % of internet users come from urban areas, and 58.8% from Java Island (APJII, 2018). Hidayat (2014) explained that the inequality of infrastructure in communication access causes a digital gap that brings a lack of access to information and technology.

In general, Indonesia is an archipelago country with various ethnicities, cultures, geography, and local resources. It is considered as a large population country in the world. Developing infrastructure is one of the priorities of national development to support the economic and social aspects in Indonesia, especially building communication infrastructure to connect a group of islands in Indonesia.

2.3 Education System in Indonesia

According to Rahman (2019), a country like Indonesia must possess an educational system that accommodates and supports all local potentials in different regions and schools with spatial and multi-dimensional structures. Furthermore, Suratno (2011) explained that the foundation of the system in Indonesia is influenced by three factors, namely religious or traditional principles, the interests of the ruling powers, and the spirit of sovereignty as a nation. However, the educational system of Indonesia has to meet the needs of a large, growing, and widely separated population, and with a large number of distinctive characteristics among the regions (Rahman, 2019). To understand the evolution of the education system in Indonesia, one must understand the overview of the current state of education in Indonesia. An outline of the growth system in Indonesia is divided into several sections, namely other periods before and after Independence Day and the 21st century.

2.3.1 Period Before the Independent Era

The education system in Indonesia is influenced by the Dutch colonial and the Japanese System (Supardan, 2008). Starting from the Dutch colonial, the history of

education during the Dutch colonial government can be divided into three periods, namely the VOC period during the 17th to 18th century, the period of the government Hindia-Belanda during the 19th century, and the period of the etische politiek in the early 20th century (Supardan, 2008). According to Kristiansen and Pratikno (2006), public education was originally non-existent in Indonesia until the colonial government established a program of village schools in 1906. Although there was traditional education based on religion, the colonial government had never gotten involved in that system (Supardan, 2008). The Dutch were the ones who introduced formal education to Indonesia (Bayhaqi, 2006). The number of education facilities increased in each decade, including private and religious schools. (Kristiansen and Pratikno, 2006).

In the Dutch colonial era (1600s–1942), education was aimed only at a particular group of people via school classification based on descent and social status (Suratno, 2011). For instance, three classifications were based on the background: education for the Dutch people, education for the indigenous (elite) Indonesians, and education for the Chinese people (Sugiyono et al., 2014). Furthermore, this selective stratification was intended to generate elite classes and encourage obedience to educated human resources status (Suratno, 2011). Bayhaqi (2006) described that the main role of Dutch administered schools was to supply the colonial administration with indigenous (elite) Indonesians that could manage part of the colony while providing education for the elite Dutch and Europeans. Moreover, Supardan (2008) described that one of the aims of education was to produce labour with a lower salary. However, some efforts were made by the Dutch to provide a more egalitarian education system (Sugiyono et al., 2014; Supardan, 2008). For example, the colonial Dutch built a school, namely Sekolah Desa (Village School), to teach low-status citizens (Sugiyono et al., 2014). However, most indigenous Indonesians remained illiterate and uneducated during the colonial rule (Bayhaqi, 2006; Sugiyono et al., 2014).

Bayhaqi (2006), as quoted by Nasution, made a comprehensive analysis of the characteristics of the Dutch education programmes and identified six characteristics as follows:

1. Extremely gradual plan of education for Indonesian children;

2. Emphasis on the inconsistent dualism between education for the Dutch and education for Indonesians;
3. Stringent central control;
4. Total control on the objectives of education for the Indonesian people, and the use of schools to produce lower-class labour;
5. The policy of concordance which made schools in Indonesia similar to the Dutch system; and
6. Lack of any systematic education plan for the Indonesian people.

In contrast, Japan colonised Indonesia during the second war (1942-1945), and in the first invasion, Japan closed all schools and re-opened them at the end of April 1942 with a new system and different aims (Sugiyono et al., 2014). They eliminated the discrimination status and used Bahasa Indonesia as the medium of instruction (Suratno, 2011). The purpose of education during the Japanese period was to provide a military school in every area of Indonesia with no concern in increasing their intelligence, and as a result, the education system was based on the military approach (Sugiyono et al., 2014). However, the advantage of Japan's colonisation is that the education system was provided for everyone, and everyone could go to school. The data showed that the average number of students in 1940 was 113 students (Dutch colonial), and it increased to 178 students in 1944 (Japanese colonial), or in percentage, an increase of 60% compared to the Dutch colonial period where the number of schools also increased by 32%.

The Japanese invasion did have a part in founding the Indonesian education system (Sugiyono et al., 2014; Supardan, 2008). For example, schools using the Dutch language taught Indonesian or Japanese, even though the curriculum was still relatively similar. As a result, the Indonesian language became the compulsory language in school, and it was required that the head of each school must be Indonesian. Sugiyono et al. (2014) described that the Japanese colonial period had erased dualism teaching in any field of education created by the Dutch colonial and it had also changed the system into three stages of education, namely primary school (6 years) or '*sekolah rakyat*', junior school (3 years) or '*sekolah menengah*', and senior school (3 years) or '*sekolah menengah tinggi*'. However, the number of teachers was

limited because many teachers were forced to work in other sectors such as administrative officers and the military, creating a scarcity of teachers. The short solution was to recruit new teachers with short term training. As a result, the education quality during the Japanese colonial had improved tremendously (Sugiyono et al., 2014).

In general, the education system in Indonesia has evolved from these two colonial periods (Dutch and Japanese). The Dutch colonial started in the 17th century until the middle of the 20th century. In comparison, the Japanese colonial was only a short period, but they provided the biggest foundation to the education system in Indonesia.

2.3.2 Independence Period

During early Independence, the education system in Indonesia was still struggling with the government war with colonialism (Supardan, 2008). As a result, the purpose of education in that era was to emphasise planting the spirit of patriotism (Sugiyono et al., 2014). For instance, every school must hoist the national flag every day in the school field, and students must sing the national song before studying (Kemendikbud, 2019b). Since 1950, the situation in Indonesia has become more stable, and the Indonesian government started to develop its education system seriously, but it faced several issues (Supardan, 2008).

Following independence in 1945, the education system was controlled by the government of Indonesia (Sugiyono et al., 2014), in accordance with the 1945 constitution, which stipulates that every person has the right to receive education and that the government has the responsibility to provide one national education system (Kristiansen and Pratikno, 2006). Moreover, Suratno (2011, p.1) described that “universal education aims to develop the sense of nationality around the supreme value of Pancasila, the five basic values of a sovereign state: a belief in the One and Only God; just and civilised humanity; the unity of Indonesia; democratic life led by wisdom of thoughts in deliberation amongst representatives of the people; and social justice for all people of Indonesia”. Muhyidin (2012) argued that the national education system must be well designed, planned, directed and integrated into missions of the national moral. Through the Ministry of Education of the Republic of Indonesia and the local government, the Government of Indonesia created an education system,

including the curriculum, distribution and placement of teachers in the regions, school facilities, and budget (Indonesia, 2003).

Furthermore, rapid development encouraged the government to build educational infrastructures all over the country, along with private-sector contributions to establish educational institutions (Suratno, 2011). The number of schools has increased every decade and doubled in 1984, with up to 130,000 primary schools, and 26 million children joined the primary school system in 1996 (Kristiansen and Pratikno, 2006). The Government of Indonesia made a priority in education policies by expanding universal schooling up to junior secondary level to improve the human capability of Indonesia. The government's commitment to extend primary schooling from 6 to 9 years was marked in 1989 with the passing of the radically new education law (Law 2/1989). Indonesia's formal education can be divided by study levels and type. General study levels are described in Figure 2-3.

Figure 2-3 Structure of the Education System in Indonesia

School age	Higher Education	Islamic S3 Program	S3 Program	Specialist 2 Program			
		Islamic S2 Program	S2 Program	Specialist 1 Program			
		Islamic S1 Program	S1 Program	D4 Program	D3 Program	D2 Program	D1 Program
	Middle Education	Islamic Sen. Sec. School	Senior General Sec. School				Senior Vocational Sec. School
		Islamic Jun. Sec. School	Junior Sec. School				
	Basic Education	Islamic Elementary School	Elementary School				
	Preschool	Islamic Preschool	Kindergarten				
	22						
21							
20							
19							
18							
17							
16							
15							
14							
13							
12							
11							
10							
9							
8							
7							
6							
5							

Source:

http://www.ibe.unesco.org/fileadmin/user_upload/archive/Countries/WDE/2006/ASIA_and_the_PACIFIC/Indonesia/Indonesia.htm

There is a fundamental change in the Indonesia's government system. Supardan (2008) supported a fundamental change in the government system that led to the resolution of regulations for law number 02, 1999, regarding the super-decentralist system in Indonesia, which includes the educational system. The central government had decentralised education management to the district level by promoting school

autonomy to enhance the distribution of quality education (Suratno, 2011). The government determined that the central government should formerly handle about 80% of education affairs, and the provinces must hand them over to local governments within the framework of regional autonomy. This law has officially gone into effect since 2001 (Zainuddin, 2015). The World Bank report (1998) identified several factors hindering the education reform (Suratno, 2011). Also, other international actors, such as the Japan International Cooperation Agency (JICA), the United States Agency for International Development (USAID), the Australian Agency for International Development (AUSAID), and the Kingdom of the Netherlands, had expressed their support for reforming schools and teachers in Indonesia.

In supporting the reforms, there was a request to amend the national budget, where the government should allocate at least 20 per cent of the national budget for education (Supardi, 2012). The central government had made another regulation such as the National Standard Education in 2012, regarding content standard, process standard, and competence standard for students, teacher standard, facility standard, management standard, founding standard, and standard score. These standards have pushed the local government to achieve the national purpose (National, 2005b). This is seen in the difference of quality between urban and rural areas, not only in terms of facilities but also in teacher performance and capability. However, the MoEC RI regulation believed that national standard education must utilise ample time for planning, implementation, and supervision to achieve national education quality (National, 2005b).

In this era of decentralisation, the government created Curriculum 2004, which was then handed over to an independent institution, the National Agency of Education Standard, to formulate core-subject competencies and develop the School-Based Curriculum in 2006. This was an era in which teachers had the authority to develop the curriculum based on the idea of “experiential and contextual learning”. There was criticism on the administrative approach to school curriculum quality assurance within the implementation. Many teachers were overwhelmed in developing syllabi, hindering them in improving their instructional practices. This problem motivated the government

to implement Curriculum 2013, emphasising the mastery of core competencies by putting forward a “project-based and scientific approach”. This approach was alleged to increase students' learning achievement (Hidayati, 2017). Curriculum 2013 makes students be more critical and creative because it is vital to encourage higher-order thinking skills, especially for primary school students (Hidayati, 2017). Moreover, the government provided the curriculum with syllabi, student textbooks, and teacher handbooks.

The number of students in Indonesia is 45,572,724, mostly consisting of primary school students (58%) (Statistik, 2021). Supardi (2012) said that the government of Indonesia had set the policy to educate until 9 years (compulsory), and certain regions had even introduced 12 years (compulsory). As a result, the number of students increased rapidly until it reached 95% in 2007 (Baswedan, 2014). In 2030, Indonesia is projected to have a bonus demographic, where 52% of the population of Indonesia is in the productive age (Kuwado, 2017). The president of Indonesia reminded that whoever will be the leader in the future must develop human resources as the key to delivering Indonesia Gold in 2045, when Indonesia predicts the country will be developed with high-quality human and natural resources (Kuwado, 2017). However, the quality of human resource development in Indonesia is low. The World Economic Forum (WEF) report stated that Indonesia procured the 46th ranking from 142 (Supardi, 2012). In the ASEAN region, Indonesia has a relatively lower level compared to Singapore (2), Malaysia (21), and Thailand (39) (Supardi, 2012). According to Kastberg et al. (2016), in the education field, Indonesia ranked 62nd place out of 73 for the score of Programme for International Student Assessment (PISA) for mathematics, science, and reading. The purpose of PISA is to assess students' preparation for the challenges of life as young adults and their application of knowledge in science, reading, and mathematics literacy to problems within a real-life context (Kastberg et al., 2016). The PISA score did improve in 2012 (Zalilia et al., 2018). Furthermore, the national exam in secondary school showed that it aligned with the PISA measurement where the students have weaknesses in higher-order thinking skills, especially in thinking, analysing, and evaluating (Zalilia et al., 2018). For instance, the national exam score for junior school in the average national in field mathematics was 46.56,

science was 48.79, and the average score for language was 65.69 (Puspendik, 2019). Hence, students must be exposed to tasks and questions that promote higher-order thinking skills in order to be critical thinkers.

Nowadays, Information Communication and Technologies (ICT) is growing rapidly. Ismail et al. (2013) explained that ICT has brought amazing changes to various fields, including education. The government is convinced that one alternative to speed up the quality of education is by using ICT (Kusnandar, 2013). For example, the MoEC RI through the Department Central of ICT have provided ICT-based education programmes such as '*Televisi Edukasi*' (educational television), '*Radio Edukasi*' (educational radio), '*M-edukasi*' (M-Edukasi) (mobile phone-based), and '*Portal Rumah Belajar*' (web-based) (Pustekkom, 2019). This is because the potential digital literacy among teenagers in Indonesia is around 30 million (Husni and Fatulloh, 2016), and children are involved in a wide variety of activities on the internet, overlapping each other, as Web 2.0 platforms have increasingly become a part of today's youth culture (Internetsociety.org, 2017). A survey conducted by the European Union Kids Online and funded by the European Commission reported that the top activities for children and youth in using the internet are schoolwork (92%), playing games (83%), watching video clips (75%), and social networking (71%). Fifty-nine per cent of European children who use the internet have a social network profile (Internetsociety.org, 2017). Husni and Fatulloh (2016) reported a local survey in Surabaya City where the respondents were between 6 and 12 years old, and showed that around 45 per cent knew about the internet from their parents, and 51 per cent used the internet at home (Internetsociety.org, 2017). It looks like ICT nowadays is a part of student activity, and it needs to be a part of the education system in Indonesia.

However, utilising ICT to support education is not without its challenges, especially in schools. There is limited content based on a curriculum delivered by ICT (Pustekkom, 2019). For instance, the Department Central of ICT MoEC RI only provided 1,206 elements of content and only 52,176 utilisations for '*portal rumah belajar*' (Pustekkom, 2019). Furthermore, there are several risks for children and young people in using ICT, for instance, the increasing number of ICT-based crimes such as online bullying, inappropriate disclosure of personal information and data theft (through over-sharing or other means), pornography, and also a lack of teacher competencies in ICT for

learning and administration in school and social life (Pustekkom, 2019). It seems that the Indonesian government still has work to do to synchronise ICT to support the education system.

The Government of Indonesia sees the importance of improving education in rural areas as a shared duty and as a form of devotion to the nation (Febriana et al., 2018). Furthermore, the biggest educational challenge in Indonesia is the country's vast geography and remote areas (Luschei & Zubaidah, 2012). There are several challenges in developing education in rural areas, especially the challenges faced by the teachers, such as the discrepancy in the teachers' quality between rural schools and urban schools (Febriana et al., 2018). Another challenge is that upgrading the skills and knowledge of primary teachers is an enormous task and more critical in remote rural regions because teachers in rural areas often lack teaching materials that can support them in delivering their lessons in the classroom (Hargreaves et al., 2009). One obvious problem is that the teaching and learning process in rural Indonesian schools regularly occurs in a poor infrastructure. Most schools in rural areas are new schools with limited facilities.

The Government of Indonesia believes that adopting information and technology would benefit in five ways: extending access to education, improving the quality of learning, the system of management school, the quality of teaching, and efficiency in terms of the promotion of education (Yaya, 2017). There are numerous programmes that the central government has developed. For example, the pilot schools for learning resource central based on ICT were developed for the front-line, remote area in five regional areas (Kusnandar, 2013). Another programme known as School the front-line used ICT (SGD) in around 164 schools, and the access programme for Universal Service Obligation (USO) for 1,001 schools in remote areas. Both programmes had the mission to facilitate schools with ICT infrastructure, such as the internet, computer and TV for e-education and e-administration (Pustekkom, 2019). In addition, the government of Indonesia provides content-based ICT such as educational television, educational radio, web, and mobile learning (Pustekkom, 2019). The extra value is that students get knowledge through ICT as another source of learning to support the learning process. Ultimately, the quality of education in rural areas increases not only for students but also for teachers. Moreover, to improve the quality of learning,

government and private parties in Indonesia organise programs to support education in rural areas. Every year, the Indonesian government sends thousands of teachers of various subjects to rural areas to meet the need for teachers through several programmes, such as SM-3T (Febriana et al., 2018). As a result, that programme revealed that schools in rural areas are a place to educate students and the schools become the centre of the village's social lives.

In general, the education system in Indonesia was influenced by the Dutch and Japanese colonials. After Independence Day, the government took over the responsibility of implementing the education system, and several systems and approaches were made. However, the huge number of students in Indonesia still need an extra strategy to improve the quality of education, and one of them is using ICT as a facility, redelivery of content education and administration system.

2.4 Professional Teachers in Indonesia

The profession of teaching cannot be separated from the education system. Research showed that 30 per cent of the students' success is due to the teacher factor (Lisdiana et al., 2018). As teachers play a momentous role in ensuring students' success, teachers continuously improve and develop as professional teachers. This situation is supported by the mandate of the constitution, in which teachers have a duty to renew and improve their competencies to improve quality education and as an essential part of long-life learning for professional development. (Herliani and Heryati, 2017). Furthermore, the Indonesian government is committed to responding to the United Nations' Sustainable Development Goals to achieve a better and more sustainable future for all. In particular, the number four goal in the Sustainable Development Goals of the United Nations is ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all. MoEC RI continually improves professional teachers with numerous activities (Kemendikbud, 2017, 2018). Therefore, professional teachers are part of the education system in Indonesia. This section explores the background, problems, and challenges teachers face in Indonesia in the 21st century.

The number of teachers in Indonesia has been increasing over the decades. At present, one per cent of the population works as a teacher (3,337,914 teachers) (Statistik, 2021). Out of this percentage, ninety-one per cent (91%) of teachers have an academic certificate and mostly teach in primary schools (45%) (Statistik, 2021). Forty-nine per cent of teachers are counted as civil servants who receive their income from the government, while others are either private, part-time teachers, or auxiliary teachers, paid by the private, central or local government (P. K. Indonesia, 2017). The demographics of teachers show that most have experience in teaching for over five years (74%), with 35 per cent of the teachers at the average age of over 45 years old, while 42 per cent are teachers under 35 years old (P. K. Indonesia, 2017). Kompas (2015) stated that the number of primary schools and junior school teachers in Indonesia exceeds the demand. For example, the ideal number of SD teachers is 1,128,479. Currently, there are 1,210,724 teachers available (Kompas, 2015).

However, teacher distribution is uneven (Kompas, 2015). Angga (2017) described unequal teacher distribution among the provinces and districts. Furthermore, Dewi (2019) described that the number of teachers in cities outnumbers teachers in village or rural areas. As a result, the situation has indirectly impeded continuous professional development among teachers, and it also disrupts the sustainability and the quality of education (Dewi, 2019; Yani, 2010). An example of such cases can be seen in the test score of the competency test for teachers (CTT) in pedagogy and professional competencies among teachers teaching in a primary school in Banten, a province of four districts and four cities. Records show that the average CTT result in these four districts was at a low rate of 51.13 compared to the average of 56.6 (Kemendikbud, 2019a).

In Indonesia, the teaching profession has gained much interest over the last decade, perpetuated by the salary offered. A teacher with a certificate can receive a handsome salary as seen in the Indonesian statute of teacher and lecture (National, 2005) that listed professional teachers could receive an income above the minimal living cost. Furthermore, it also comes with welfare benefits such as basic income, special allowance, and professional allowances. Special allowance refers to an allowance for a teacher as compensation for living in special areas, for example, in remote and border areas. The requirements for a professional teacher in Indonesia are an

academic qualification, competencies, a professional certificate, a healthy body and soul, and the ability to embody national education achievement (National, 2005). Based on academic qualification, a teacher who teaches in primary and secondary school should graduate with an undergraduate degree in the education field or a Master's degree for lecturers (National, 2007).

The Indonesia statute of teacher and lecture lists that Indonesian teachers must possess four competencies to be qualified as professional teachers (National, 2005). The four competencies are pedagogies, personal, social, and professional competencies, which are obtained through professional education. The competencies are based on 24 point items (National, 2007). Firstly, pedagogies competency is connected to creating a teacher who can manage students for learning, such as understanding students, designing and implementing learning processes, evaluating and developing students' potentials, to actualising them for real-life application (Fahdini et al., 2014).

Second is personality competency, which translates to teachers who embody a good personality, stability, maturity, and wise and authoritative stances in students' eyes (Fahdini et al., 2014). Nursyamsi (2014) described that the teachers' personality and character should be seen as a model and inspire students to do better. The quality of the psychological relationship between students and teachers is often initiated by the teacher's good personality (Nursyamsi, 2014). This is also illustrated by Nursyamsi (2014) who maintained that teachers who displayed quality attitude and behaviour could aid in fulfilling the condition for optimum teaching and learning process. The next competency is social competence, as seen in how teachers can communicate and interact effectively with students, colleagues, parents, and social communities (Fahdini et al., 2014). Last but not least is professional competency. In professional competency, teachers are expected to have mastery over the subject, including the structure, concept, and knowledge (National, 2007), and competent to guide students in-depth for them to achieve the target in the standard national curricula (Fahdini et al., 2014).

The road to being a professional teacher is not an easy one, as described by Fahdini et al. (2014), professional teachers would never stop learning, and they always need

to reinvent themselves continuously by not standing on outdated teaching practices and repertoire. Among the ways that teachers can improve themselves are through short courses, research-based learning, tutorial, and exercises provided by professional learning communities and academic qualifications.

2.4.1 The Challenge of a Professional Teacher in Indonesia

Professional teachers are often the focus of the education system in Indonesia. In 2005, Statute Number 14 addressed the teacher and lecturer system to develop professional teachers (National, 2005). Furthermore, teaching is a profession that requires one to have a certificate (National, 2005). 'Professional' is generally understood as a job or activity done by people as a source of their life, and they are regarded as someone who has the skills, knowledge, and proficiency by standard or norm. Usually, all of these traits are acquired through education (National, 2005). This echoes the earlier sentiment by Al Rasyid (2015), as educating people is the core of quality education, and quality education comes from professional teachers. This similar sentiment is also shared by Herliani and Heryati (2017), who argued that teachers have an obligation to update themselves regularly and improve their competencies through continuing professional development programmes, and all teachers should embody the essence of being lifelong learners. Furthermore, teachers who build a good learning process would then continuously produce good quality education and prime characteristics (Herliani and Heryati, 2017). The effort to encourage teachers to participate in continuing learning activities is also supported by the Government of Indonesia, as seen in their way of issuing regulations such as regulation Number 16, in 2009, regarding teachers' position and credits, and continuing professional development is a requirement for teachers to step up to higher ranks (Kemendikbud, 2018). The government developed the CPD programme, which is discussed in the next subsection.

Despite the efforts, it was found that the quality of teachers in Indonesia remains low. Kusumawardhani (2017) described that Indonesian teachers scored lower competency scores compared with teachers in neighbouring countries. This condition was supported by the result of the CTT which the government of Indonesia, since 2012, has conducted an assessment competency for teachers, named Uji Kompetensi

Guru (Competency Test for Teachers (CTT)). The purpose of this is to map out teachers' competencies in terms of pedagogy and professional competencies in part of a statute (Baswedan, 2014). The test examined teachers through 22 essential indicators of pedagogy competence and 59 indicators of professional competence (Bakri and Sabar 2015). Table 2-1 shows the scoring average of teacher competencies at all teacher levels from 2015-2017. There is a progression of teacher competencies at all teacher levels, probably as a result of the creation of various programmes for continuing teachers' professional development since 2015 by the government (Kemendikbud, 2017, 2018).

Table 2-1 The Results of Competency Test for Teacher (CTT) 2015-2017

Level of School	Average Competency Test for Teachers		
	2015	2016	2017
Kindergarten	43.74	65.82	68.23
Primary School	40.14	63.8	62.22
Low lever secondary school	44.16	65.33	67.76
High level secondary school	45.38	66.66	69.55

Referring to Table 2-1, primary teachers scored lower competencies than teachers in other levels. It is also worrying to see that the competency test scores for primary teachers was not as positive as other levels of teachers (Kemendikbud, 2018). Another fact shows that the pedagogies competency scores were lower than professional competency in any level of teaching (Kemendikbud, 2019a). This trend strongly suggested a need for the government to focus on primary teachers and find ways to increase their competencies, especially in pedagogies and professional competencies. This matter also needs serious attention as most Indonesian teachers are primary school teachers.

Another issue that plagues Indonesia's education scenario is lack of skill in professional teachers. This matter was magnified in 2018 due to the power of social

media viral culture when MoEC RI received a complaint about the National Exam Based on Computer (NEBC) for a secondary school (Ariyana et al., 2018). Among the issues was that the test was too difficult for students, especially the mathematics and science subjects (Ariyana et al., 2018). The National Exam (NE) data in 2018 for lower secondary school showed that the average score in Mathematics was 44.04 and Science was 48.05, compared to the Language subject, which scored 64.83 on average. In contrast, primary school students showed an unequal knowledge of higher-order thinking skills for the Language subject (Setiawati, 2019) and possibly other primary school subjects (Yuliandini et al., 2019). As a result, the government has noted this problem and analysed a weak knowledge of mathematics and science, and another subject is referred to as the HOTS approach (Ariyana et al., 2018).

Furthermore, the complaint was responded to by the MoEC RI. The minister of education quoted that the government raised the difficulty level during the National Exam Based on Computer (NEBC) in 2018 (Sukmana, 2018). This was not without any reason when the government questioned that decision. The government responded by saying that the decision was made to increase the rank of PISA and Trends in International Mathematics and Science Study (TIMSS) (Sukmana, 2018). Therefore, in 2018, the test used Higher-Order Thinking Skills (HOTS) to ensure that the local students could keep up with the international standard (Ariyana et al., 2018). Since then, HOTS has become the route that the government would follow to improve the quality of learning and graduation (Ariyana et al., 2018). Some experts believe that HOTS is one of the essential components for an individual to survive in the 21st century (Retnawati et al., 2018). HOTS refers to Bloom's revised taxonomy; it is an incision among the three top levels of ability in the cognitive dimension (analysing, evaluating, and creating) (Retnawati et al., 2018).

However, Retnawati et al. (2018) described that teachers' knowledge of HOTS, their ability to improve students' HOTS, solve HOTS-based problems, and measure students' HOTS are inadequate. Nevertheless, teachers admitted the importance of HOTS and made recognised efforts by incorporating innovative learning models to encourage HOTS (Retnawati et al., 2018). Another research study showed that the primary teachers in Indonesia mostly understand the concept of HOTS and felt that HOTS learning is applicable at the primary school level, but they face challenges in

designing, implementing, evaluating and delivering HOTS-based learning materials (Rapih and Sutaryadi, 2018). This research showed that there was an issue with pedagogical and professional competencies. Chapter 1 has described this situation as a gap of pedagogy content knowledge in this study, and the next subsection explores it further (Subsection 2.4.3 page 40) through a national training programme (NTP). Meanwhile, the government of Indonesia expects that teachers have pedagogical and professional competencies that can develop curricula, implement learning processes, and evaluate and assess students and content material (National, 2007; National, 2005). However, the current situation suggests that Indonesian teachers have yet to achieve pedagogical and professional competencies to implement HOTS in classrooms.

In general, there are challenges for teachers in Indonesia to be professional teachers. The government of Indonesia is doing an enormous amount of work to support professional teachers to counter the issue of low-quality teachers in Indonesia, and most of the focus is placed on improving pedagogical and professional competencies among teachers. Moreover, the paradigm in the learning process in Indonesia has shifted, where it now focuses on HOTS as the system to achieve the best quality of learning and quality of graduates. However, implementing HOTS is a challenge as teachers understand the importance of it but lack the skills and knowledge to design, implement, evaluate, and deliver HOTS-based learning materials. The next subsection explores the CPD programme for teachers in Indonesia.

2.4.2 Continuing Professional Development Model in Indonesia

The government of Indonesia realises that the success of education is not solely seen in the curricula and infrastructure, but also in developing professional teachers through continuing professional development (CPD) programmes. A broad view of the definition of CPD was articulated several years ago by Christopher Day, who quoted the range of experiences that come under the purview of CPD:

“Professional development consists of all-natural learning experiences and those conscious and planned activities which are intended to be of direct or indirect benefit to the individual, group or school, which contribute, through these, to the quality of education in the classroom. It is the process by which, alone and with others, teachers review, renew and extend their commitment as change agents to the moral purpose of teaching; and by which they acquire and develop critically the knowledge, skills, and emotional intelligence essential to good professional thinking, planning and practice with children, young people and colleagues throughout each phase of their teaching lives” (Hayes, 2015, p. 5).

However, Ridley (2011) argued that CPD priorities lean towards the national initiatives and the school development plan rather than catering for individual professional development. Moreover, MoEC RI has specified the definition of CPD as a measure to reduce the gap of knowledge, skills, social competence, and personal capabilities that the teachers have to keep up with future demands (Al Rasyid, 2015).

Furthermore, there are several perspectives to build CPD. Many experts believe that there are many existing models that support CPD (British Council, 2018; Dichaba and Mokhele, 2012; Ngeze et al., 2018). One of the most common is the cascade model, which is commonly used to train a large number of in service teachers in a short span of time, particularly for developing countries (Dichaba and Mokhele, 2012; Ngeze et al., 2018). The cascade model involves the delivery of training through layers of trainers until it reaches the final target group (British Council, 2018). Ngeze et al. (2018) supported that the cascade model involves training the trainers who then have to train other trainers or teachers. This process is repeated to the lower levels until the target group is reached. This type of model is a top-down model of professional learning where there is a flow of information from ‘expert’ teachers to other teachers

or multipliers at different levels of teaching and the process is repeated to the lower levels until the target group is reached by involving trainers selected from a pool of teachers based on certain criteria (Ngeze et al., 2018). In action, teachers receive initial training and skills via a workshop from expert teachers. These teachers in turn train other teachers at the lower levels of the hierarchy (Ngeze et al., 2018).

This model relies on people to pass on their newly procured understanding and expertise and also change their roles while receiving and conducting training (Ngeze et al., 2018). Therefore, Ngeze et al. (2018) argued that the success or failure of this model depends on the way it is implemented by these trainers. If this is not done systematically, then the system fails and the training is wasted. Nevertheless, this model has been successfully implemented for many teachers in other countries such as Algeria, Bangladesh, China, Nepal, and South Africa, including in the UK (British Council, 2018; Ngeze et al., 2018).

However, this model can be adopted in several conditions due to its advantages, such as if training is for a large number of individuals, when funding is an issue and there is a need for a cost-effective approach, and in challenging environments where there is a need to rely on local delivery of training packages (British Council, 2018; Dichaba and Mokhele, 2012; Ngeze, et al. 2018). This model is useful in delivering a range of contexts, from teacher training to leadership and management development (British Council, 2018).

Despite the fact that this model is commonly used to train a large number of teachers in CPD, there are several issues that should be recognised as model weaknesses (Ngeze et al., 2018). For instance, the content is passed from the 'expert' teachers to other teachers or multipliers at different levels of teaching to the target audience without discussions or feedback between them, which can cause misinterpretation of the content received from the teachers to other teachers; some teachers lack confidence in conducting the training and disseminating knowledge; and others lack sufficient knowledge and understanding to manage the training process (Ngeze et al., 2018). Furthermore, Dichaba and Mokhele (2012) pointed out that even though teachers had knowledge of the content as well as the skills needed to present the subject content, many of the teachers stated that they would find it difficult to share

the information with their fellow colleagues in the context of dissemination. This leads us to conclude that the major problem may be that of the process of disseminating information to the next generation of teachers.

To address these issues, Hayes was cited by Ngeze et al. (2018), who suggested five measures to increase the effectiveness of the cascaded training model, including making the training experiential, reflective, and open to reinterpretation, diffusion of expertise through the system, and the inclusion of stakeholders in the preparation of training materials. It is important to first have a detailed understanding of the desirable characteristics required for a teacher and then build the preparation tool to support the training by conducting system monitoring and evaluation, including using technology.

Furthermore, technology has been involved in the CPD. McAleavy et al. (2018) argued that technologies have obvious links between the principles of effective continuous professional development identified in international literature and the potential application of technology. Continued professional development, mediated by technology, can engage teachers directly and circumvent the often-cited weaknesses of off-site workshops and the indirect cascade model. For example, several CPD projects have been implemented using technology, such as in the UK where the iPad was used to be integrated with CPD in several school locations (Beauchamp et al., 2015; Fenton, 2017), but the biggest integration project of CPD with technology was held in Bangladesh, where they helped in improving English teachers through English in Action (EIA) for 75,000 teachers until the year 2017 (Walsh et al., 2014). This program used the mobile phone-based technology kit to deliver continuing professional development resources within an open distance learning (ODL) platform. Eight modules were introduced, emphasising the four skills of listening, speaking, reading, and writing (Walsh et al., 2014). As a result, EIA currently uses a mobile phone-based technology kit among 12,500 teachers to improve the English language proficiency of 700,000 students (Walsh et al., 2014). The programme aims to educate teachers to use and access EIA's resources to get support from a teacher-partner within their school and a community of teacher colleagues from their areas (Walsh et al., 2014). In contrast, there were other programmes to continue professional development, such as Massive Open Online Courses (MOOC) in Algeria (Sia and

Cheriet, 2019) that showed quite an interesting result, where teachers were found to have low familiarity and weak interaction with MOOCs in general. This small-scale pilot study was tasked with probing teachers to measure their familiarity with MOOCs in general and their inclination toward CPD with teachers' need to access MOOCs as part of the training by involving 180 teacher samples who participated in continued professional development from a wide number of university teachers from different Algerian universities. The result shows that few Algerian university teachers were familiar with MOOCs, and even fewer interacted with MOOCs (Sia and Cheriet, 2019). The interaction of teachers with MOOCs is limited to the range of less than one to two hours per week; a range that reflects, even though it is not mean, poor interactive experiences and teachers claimed that their understanding of CPD was restricted to action in a conference room setting, travel, and transportation (Sia and Cheriet, 2019). Thus, in general, the result was seen in teachers' having a limited understanding of using MOOCs for CPD (Sia and Cheriet, 2019). Other studies also showed that teachers were less enthusiastic about other CPD programmes, and attendance was only made due to formality and the mandatory call to attend (Sia and Cheriet, 2019). Furthermore, teachers as individuals should perform as professionals, by practising their knowledge not only in the class but also in their community. Reflective practice supports the continual professional development of teachers, where there are potential benefits of incorporating such reflection which is personal and might stem from one's experience during formal training and education, or possibly through informal mentoring they may have received (Womack, 2022). Therefore, some experts described that reflective practice is actively and deliberately focusing one's attention on an experience with the intent to learn from what happened and use that knowledge to take different or perhaps more productive action in the future (Womack, 2022), and this model is widely recognised as underpinning many models of professional learning that teachers use to achieve specific objectives of formal CPD programmes (King, 2022; Parker et al., 2016). Thus, reflective practise can be part of CPD for teachers in maintaining their knowledge as a step to reduce the gap of knowledge, skills, social competence, and personal capabilities that the teachers have to keep up with future demands (Al Rasyid, 2015).

Reflective practice is integral to the development of all educators, regardless of the sector in which they teach, and is widely used to frame professional learning in practice-based disciplines (King, 2022). Some experts believe that reflective practice is a process an educator can use not only to describe an event, but also to identify a lesson learned, an insight gained, or to see their teaching from another perspective (Brookfield, 2017; Schön, 1987). The researcher can understand that the person will have value dimension and belief in their knowledge in future. Several experts proposed that the model of reflective practice encourages one to think and learn from an event to change future action or to influence decision-making; thinking about the past improves the actions to be taken in the future (Parker et al., 2016; Womack, 2022). It can be immersive understanding of teachers continuously studying to maintain their capability to be professional teachers as a profession. However, Shulman brings critical aspects of professionalism to light; there are three fundamental dimensions of professional work—to think, to perform, and to act with integrity (Shulman, 2005). He believes that these three dimensions do not receive equal attention across the professions, and professionals must learn abundant amounts of theory and vast bodies of knowledge (Shulman, 2005). They must come to an understanding in order to act, and they must act in order to serve (Shulman, 2005). To gain recognition as an experienced professional, individuals are required to reflect on both the effectiveness of their practice and the impact it has on others, drawing on scholarly literature to support the reflective analysis of their practice (Lea and Purcell, 2015). These reflections can be presented in the form of a written application (the most commonly used method) or via professional dialogue that creates space and ‘time out’ to talk about applicants’ experiences of learning and teaching. This means that reflective practice can be implemented in the space of teacher communities to develop CPD (Asghar and Pilkington, 2018).

In addition, one of the efforts of CPD can be done through strengthening the performance of TWGs (Murniati et al., 2019). TWGs are a social community approved by the Indonesian government that aims to improve the competencies and skills of professional teachers (Al Rasyid, 2017). Moreover, TWGs can be a forum to develop and train educators to repair and improve the competence of educators related to the

development of teaching materials, model learning techniques, research methods, class action, and solving the problem of teachers through dialogue, sharing experiences with peers, as well as colloquium and lesson study (Murniati et al., 2019). The government's initiative involved these communities as part of the national framework in CPD. For instance, there is a national scale project through TWGs to accelerate the development in the education field, quality, and system in pedagogy competencies, namely ZLCIP (Lisdiana et al., 2018). This project commenced in 2018 to be designed and implemented in 2019 (Lisdiana et al., 2018). This programme is discussed in-depth in the following subsections for the purpose of this research.

The Government of Indonesia, through MOEC RI, regularly conduct massive CPD programmes as one of the national frameworks in Indonesia's education systems. This national framework aims to improve teacher competencies as MoEC defines regularly. Therefore, several CPD programmes can be identified in the last decade, such as Better Education through Reformed Management and Universal Teacher Upgrading (*Program Bermutu*). These programmes started in 2009-2013 and involved 16 provinces at 75 districts, with financial aid secured by some international institutions (World Bank, IBRD, IDA, Government of the Kingdom of the Netherlands, and Government of Indonesia) (Sunandar et al., 2008; Word Bank, 2015). This programme aimed to support the quality and performance among teachers by improving their knowledge in the materials and skills in the learning process (2007-2013), and this programme was aimed at teachers in primary schools and lower secondary schools (Sunandar et al., 2008). Another programme, Pro Dep (Professional Development for Education Personnel), aimed to develop professional administration in schools to aid the government of Indonesia in increasing the competencies and performance of head teachers, supervisors and administrators in district areas.

Furthermore, the government consented to develop teachers' competencies through massive training programmes in the last five years. Five programmes have been identified since 2015, as mentioned in Chapter 1. The government integrated all the training programmes in response to the result of CTT, in which teachers had a low competency score in professional and pedagogy knowledge (Kemdikbud, 2016; 2017,

2018). Thus, each training programme had names and specific goals to improve the teacher's competencies, but the final result is improved teacher competencies as the CPD. Moreover, several CPD programmes that were developed by the MoEC RI adopted the cascade model and used technology in the programmes. One of these programmes is discussed in the next subsection.

There are similar patterns in the programmes from the MoEC RI for CPD, in which teachers who finish the programme should make action plan activity forms to disseminate the programme to their colleagues (Handayani et al., 2018; Bestary et al., 2019; Surapranata, 2016). The action plan activity asks teachers to train and disseminate their knowledge to their colleagues in a teacher community or school. The MoEC RI was trying to expand the training impact and content of the programme as a part of developing teachers to be professional teachers (Surapranata, 2016).

In general, there are many terms to define CPD. The government of Indonesia has its own definition of CPD and regularly through MoEC RI, conducts CPD programmes on a massive scale. One of the common models used for CPD is the cascade model that MoEC RI implemented in several massive programmes. Furthermore, integrating CPD with technology will assist the government in increasing the effort for a large-scale program. However, it is important to note that not every professional development strategy will work to the same degree, as many factors can help or hinder its success, including goals, focus, and technology.

2.4.3 Zoning based Learning Competency Improvement Program

Nowadays, the government of Indonesia, through the MoEC RI has developed a CPD programme for teachers called '*Program Peningkatan Kompetensi Pembelajaran Berbasis Zonasi*' (Zoning based Learning Competency Improvement Program (ZLCIP)), as part of the continued professional development mandated from the statute (Lisdiana et al., 2018). It was then called the National Training Programme (NTP). As mentioned in the previous chapter, the NTP is a combination of strategy in training by empowering TWGs. This programme has a blended face-to-face and online class system for teachers (Zalilia et al., 2019). In addition, the MoEC RI uses mixed strategies to run the programme through in-service training (IN), on the job training

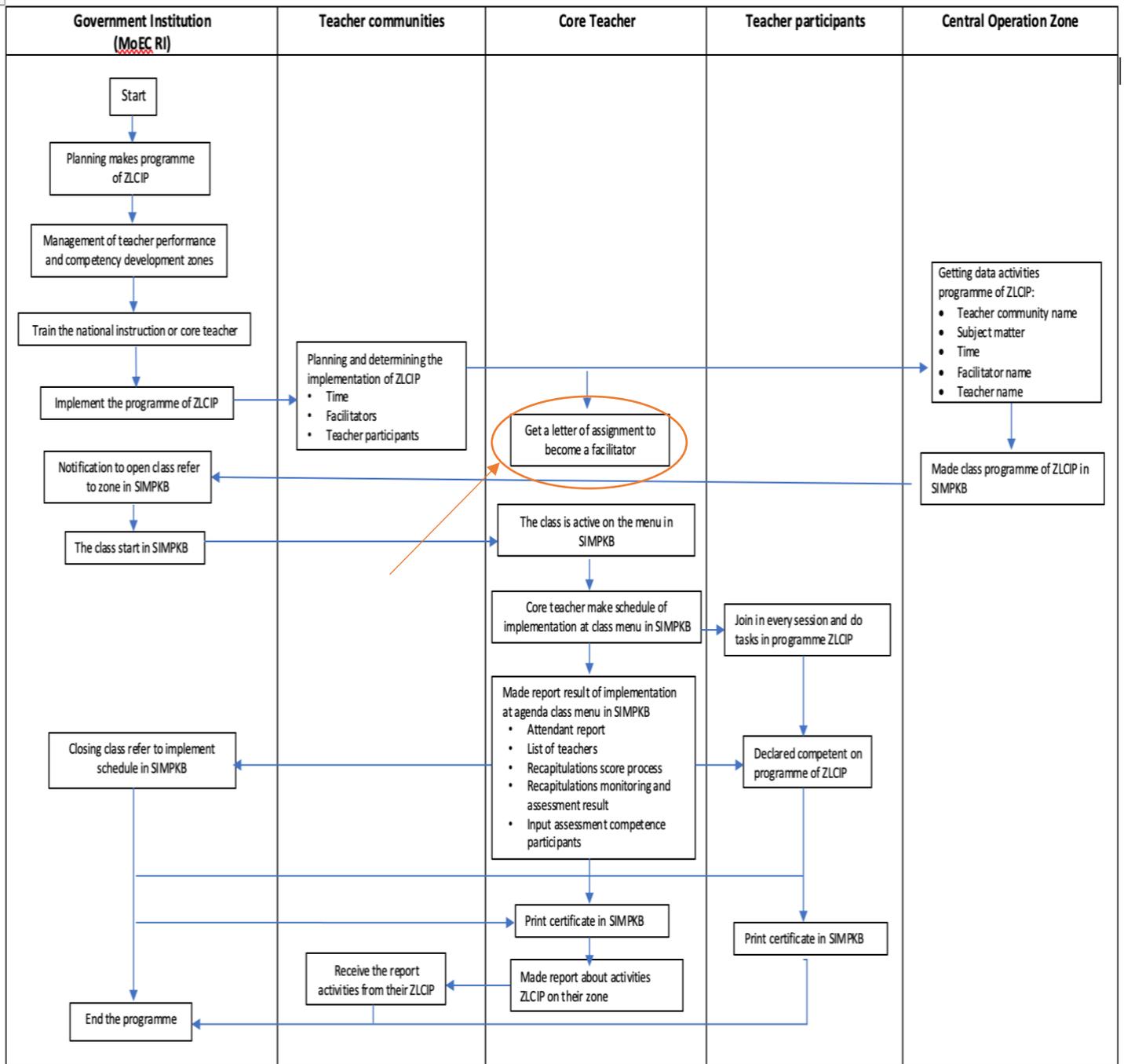
(ON), and a Learning Management system (LMS) for online mentoring (Handayani et al., 2018).

This programme is part of the policies planned by the MoEC RI, and it aims to cultivate teachers to perform in the orientation of HOTS. In addition, the NTP responds to issues connected to teachers' lack of knowledge of HOTS as pedagogy knowledge content and these activities as part of improving pedagogical and professional competence in response to the United Nations' fourth Sustainable Development Goal. The programme also aims to build the learning process and improve teachers' competencies through coaching in planning, implementation, and cultivating the skills to perform learning evaluation and improving students competencies with a higher-order thinking approach (Lisdiana et al., 2018). Furthermore, this training is conducted by teachers performing analyses, synthesis and creation, cultivating and mirroring the method and strategies of higher-order thinking skills (Ariyana et al., 2018; Mediaindonesia.com, 2019). It is hoped that teachers would be accustomed to delivering lessons based on HOTS knowledge (Lisdiana et al., 2018). Moreover, this programme is open for all teachers, be it primary teachers, secondary school teachers, headteachers, or supervisors of schools (Ariyana et al., 2018).

Supporting document is provided from the MoEC RI. The MoEC RI provides many HOTS subject matter, guidance book, manual book, LMS and supporting system, including the budget to support the implementation of the NTP (Bestary et al., 2019; Handayani et al., 2018; Lisdiana et al., 2018). The program itself is a huge-scale programme involving 64,000 core teachers as trainers (Lisdiana et al., 2018). The government is adamant about the efficacy of the programme. For one, teachers are not required to travel to receive training, but they can be trained and share their skills, competencies, and experience with other teachers and peers from the same areas (CNN Indonesia, 2019). It can be seen from the action of the core teachers after receiving training from the central government where they must create the training for their colleagues in the same areas/zone with the requirement set by MoEC RI (Handayani et al., 2018). It seems that they adopted the cascade model to implement the programme. Even though it was not declared clearly that MoEC RI used the model, it can be seen from the step of implementing the programme and the implementation flow chart of the NTP programme through system management information as shown

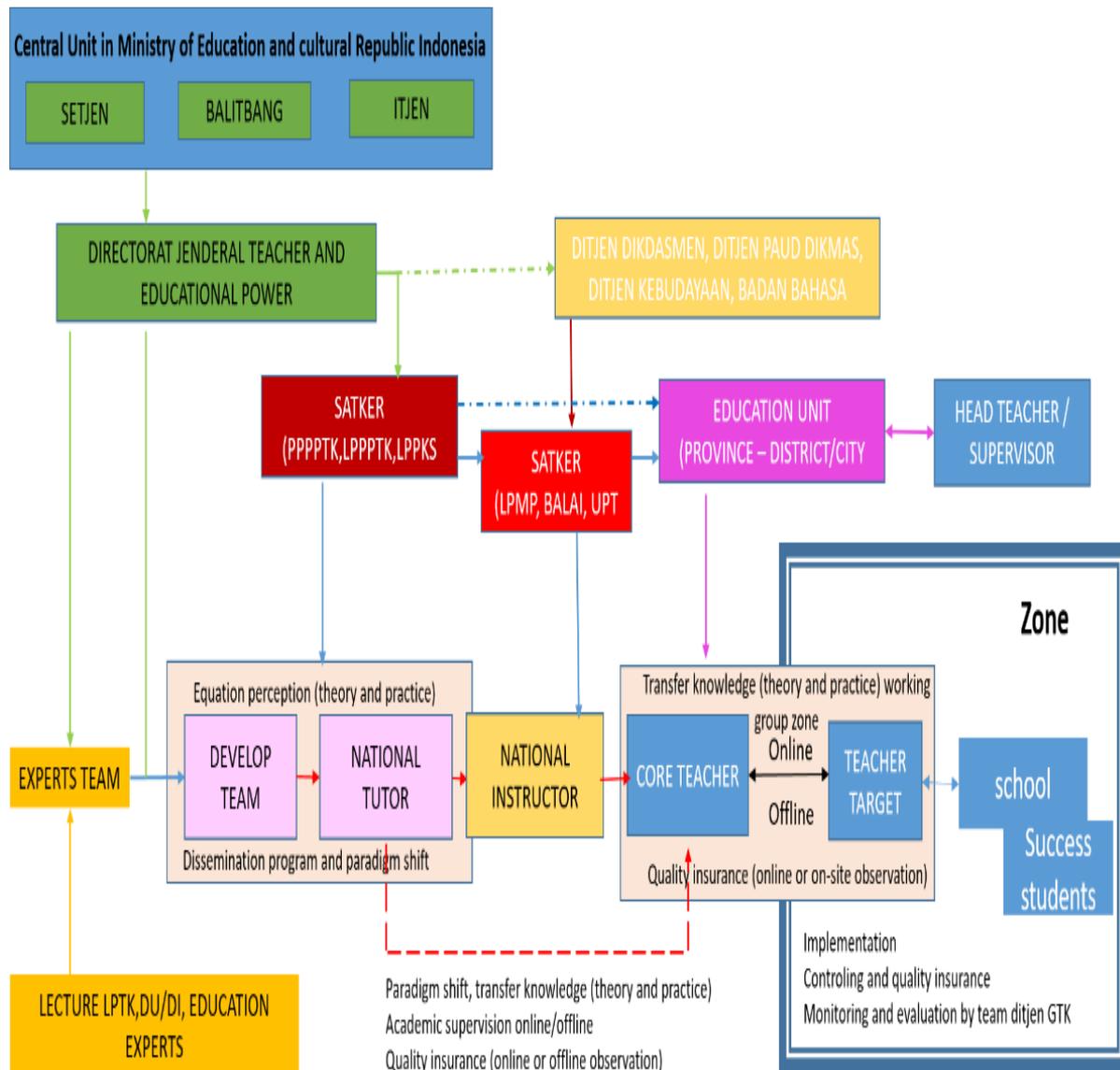
in Figure 2-4. The figure shows that core teachers receive a letter of assignment to become a facilitator to disseminate their knowledge in the teacher community in their zone. A core teacher receives training in a central government institution. This training is not the training of a trainer, because in the training, a trainer is a model used to describe how to train potential instructors or less experienced instructors, which is the best way to deliver training materials to others (British Council, 2018). However, the NTP programme involves the delivery of training through layers of trainers until it reaches the final target group which is the zone or community area of their members (Handayani et al., 2018).

Figure 2-4 Flow Chart Management Mechanism in the National Training Programme



In addition, every step that leads to the programme was planned meticulously to ensure a smooth implementation, such as training for the trainer, designing the curricula, and tasking the central team to create a strategic implementation. The program details can be referred to in Figure 2-5.

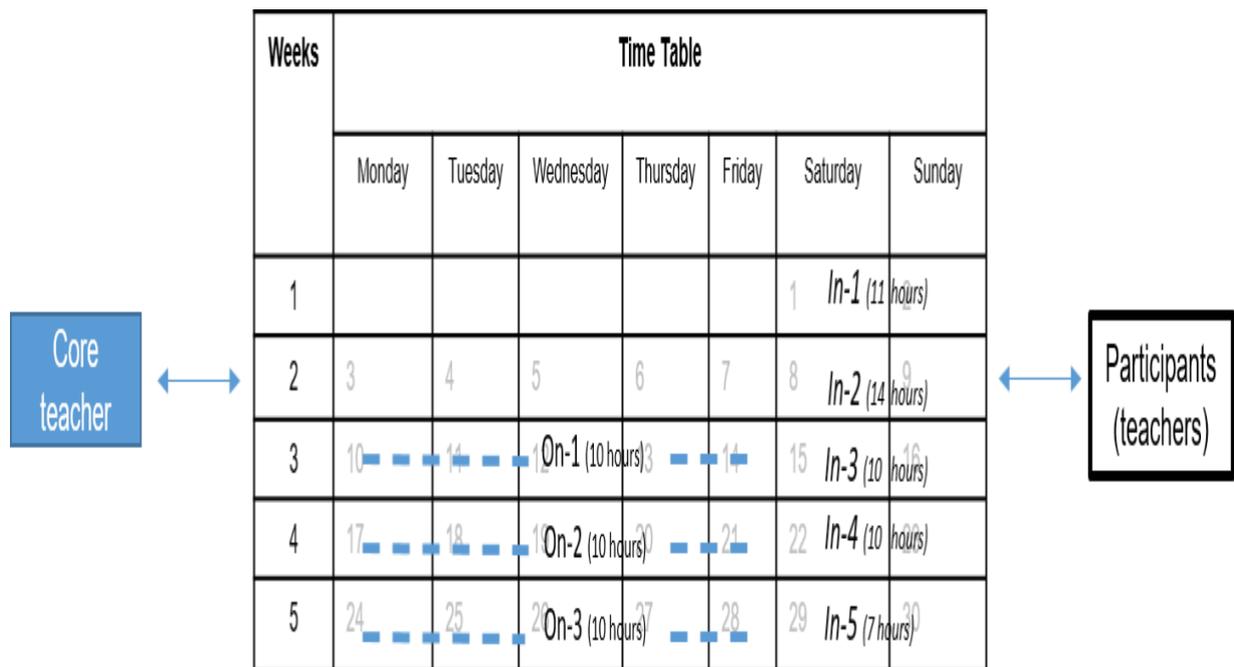
Figure 2-5 Flow Chart Implementation of the National Training Programme



The government took serious note by creating HOTS-based modules for every subject and also for every level of education. For example, the government made seven subject materials with 35 packets split into 92 modules for primary school teachers in the NTP HOTS module (Bestary et al., 2019). The government provides a HOTS programme for every subject for teachers based in their zone. The programme aims

to improve students' learning competency, and teachers can tailor the programme to suit their needs and circumstances. For example, teachers can take two modules of HOTS or use the HOTS module based on the weaknesses of the students in HOTS. Furthermore, based on the document, the system of NTP holds a regular meeting in the in-on-in model that combined meeting/workshop and self-study (Handayani et al., 2018). The details of the programme are seen in Figure 2-6.

Figure 2-6 Learning Activities in the National Training Programme



The manual book describes IN as a face-to-face learning process between core teacher as facilitator and teacher (Handayani et al., 2018). The session is usually held five times by the professional learning community or teacher working group base. The zone needs to be well prepared with sufficient facilities such as a meeting room (for 20-30 people), computer, internet connection, and electricity (Lisdiana et al., 2018). ON was held three times where teachers would continue after the in-service learning program held in school.

Figure 2-7 Steps of Learning Activities in the National Training Programme

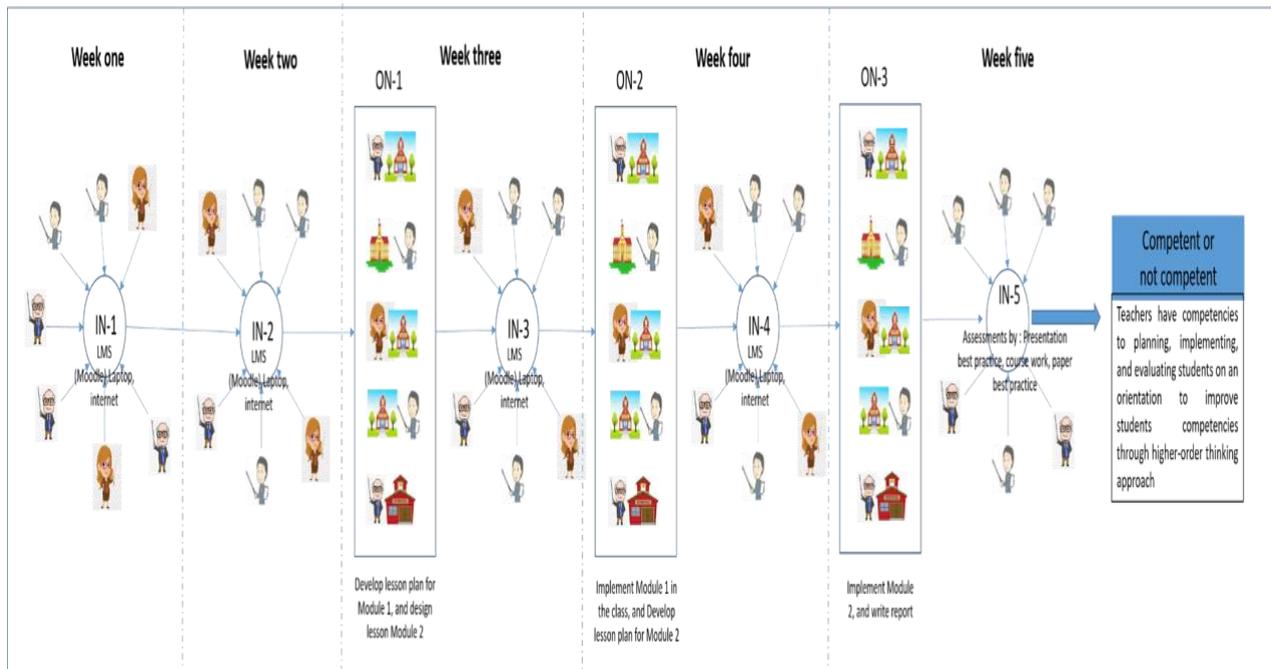


Figure 2-7 describes in detail the steps of the NTP. In the first activity (IN-1), teachers are given general information about the program, such as the policy of this program, general knowledge about HOTS, and the introduction of class assistance online by the Moodle System (Bestary et al., 2019). The TWG is equipped with a computer, LCD projector, and internet connection (Handayani et al., 2018; Khaer, 2019). Furthermore, teachers who teach in primary schools are asked to hand in reports on students' scores based on the local tests from school (Bestary et al., 2019). Within the group, the teachers conduct an analysis to identify difficult topics and common mistakes committed by the students (Bestary et al., 2019). After that, the group members decide on two HOTS modules to be developed in this training (Handayani et al., 2018), and the content they choose should be in line with the semester they teach in class.

The next activity is IN-2, where teachers focus on Module One before implementing another module (Bestary et al., 2019). Teachers develop and review the design of Module One using pre-prepared worksheets, and they are also responsible for designing tests and measurements based on HOTS assessment (Bestary et al., 2019). Furthermore, the Moodle application has prepared all the information, including tasks and worksheets. After that, they join the ON-1 (on-the-job learning), an in-school activity (Bestary et al., 2019). Teachers are expected to develop a lesson plan-based

on Module One when they carry out their teaching duties in school. The next meeting is called IN-3, and teachers must bring a lesson plan for reviewing and sharing among core teachers and peers. The next activity, ON-2, is when teachers implement their plan in the classroom. During the implementation, teachers need to work on their lesson plan based on Module Two. Activity IN-4 is a reflection session of practice for Module One and review lesson plan for Module Two. The following activity is to implement Module Two in class, and teachers attempt to develop a report as best practice, an activity that would commence ON-3. At the end of the training, the teachers deliver a presentation based on their report practice. This activity is called IN-5. During the programme, teachers are evaluated based on the assessment of inactivity in service, and they are monitored based on course work by the government, where the result would be graded as competent or not competent (Handayani et al., 2018). The total training is 82 hours and 30 days with 10 coursework (Bestary et al., 2019).

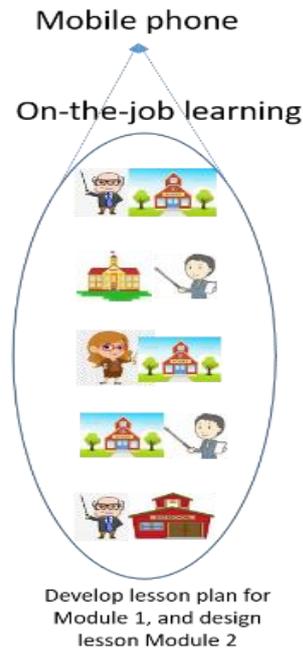
The LMS has a part in mentoring the core teachers and participants. The purpose of LMS is to facilitate core teachers and participants during the programmes through online systems, while the main process of face-to-face classes is to focus on practice and implementation (ON) (Zalilia et al., 2019). Moreover, the LSM has a learning structure (IN-1, IN-2, ON-1, IN-3, ON-2, IN-4, ON-3, IN-5) complete with content and source of HOTS, including administration and communication tools (Zalilia et al., 2019). The LMS also provides some facilities such as a manual that describes making video calls and using discussion forums to discuss. In addition, the participants can access content through two gateways: through <https://paspor-gtk.belajar.kemdikbud.go.id/>, and open-source access through the official website of MoEC RI, named belajar.kemdikbud.go.id. Both of these points can be accessed through various devices such as a computer, laptop, tablet, and mobile phone (Zalilia et al., 2019). Even though the LMS is only part of the learning process, MoEC RI uses it to monitor the implementation and administration of this programme. Consequently, the local authorities provide a meeting room, electrical power, some technological facilities, and human resource to support the learning process in this programme (Lisdiana et al., 2018).

However, the manual book on the NTP did not have a detailed explanation of the collaboration matters. Fenton (2017) described that the success of the CPD programme is strongly correlated with how much time is given to teachers to collaborate with colleagues and learn from their peers, and see how technology is integrated into learning. Even though the manual specified the activities in the in-service training, no sufficient explanation was included on how the collaboration would continue once training is over. Besides that, there was a lack of detail in the application of Moodle LMS, especially its use in communication and collaboration. This system looks in line with the topology mobile learning attention on learning out of the classroom, wherein the success is used in field trips and professional development. The topology of this should have a web browser, database manager to organise and relate the events as a knowledge structure, and communications manager to support synchronous voice and data communication and asynchronous sharing of knowledge (Pachler et al., 2010). They provide one session in training for this tool (Bestary et al., 2019).

While there are other alternatives for mobile devices, such as smartphones, they have a relatively strong computing capability despite the small size (Johnson and Trivedi, 2011). Smartphones are also built with good internet connectivity, and there are various types and easy-to-use mobile application software or applications that can be useful for education (Johnson and Trivedi, 2011). The mobile phone is opening doors to enable education across time, location, and communication, and data gathering has never been easier than now (Ilic, 2013). Technically, smartphones are defined as mobile phones that offer capabilities similar to personal computer functionality and can download applications (Google, 2011).

Based on a survey in 2017, the number of people who owned a mobile phone (50.08%) exceeded the number of people who owned a laptop (25.72%) and tablet (6.52%) in Indonesia (APJII, 2018; Kominfo, 2017). In Indonesia, it is reasonable to assume that everyone has access to a mobile phone regardless of location. Therefore, it makes perfect sense to have the Moodle (LMS) system compatible with a mobile phone application to help teachers collaborate and communicate with their peers in the NTP, as seen in Figure 2-8.

Figure 2-8 Mobile Phone Framework in the NTP



Referring to Pachler et al. (2010), mobile learning – as we understand it – is not about delivering content to mobile devices, instead it is about the processes of coming to know and being able to operate successfully in and across new and ever-changing contexts and learning spaces. It is about understanding and knowing how to utilise our everyday life as learning spaces (Pachler et al., 2010). Therefore, if it needs to be explicitly stated, for the researcher, mobile learning is not primarily about technology. For example, past studies have found that most teachers acknowledge mobile phones and their relevancy to the internet, educational applications, calculators, calendar tools, and tools currently used for administrative and instructional tasks (Thomas et al., 2014). However, teachers are experiencing barriers in using mobile phones in education, such as lack of access to Wi-Fi, fear of change, lack of training, modelling, personal use, and motivation, as well as knowledge, teaching beliefs, self-efficacy, and school culture (Kearney et al., 2015; O'Bannon and Thomas, 2014). Therefore, it must be investigated properly of "how knowledge exchange of teachers on the HOTS approach in NTP by utilising mobile phones in the context of CPD rather than look at mobile phones as a device". Some experts argue that a mobile phone has the potential to be applied to any teacher education to support continued teachers professional development in developing countries (Miao et al. 2017), and only a few research

studies talked about mobile phones in actual exchanges of knowledge in the context of teachers' professional development (Motteram et al., 2020).

Furthermore, as for the certification, teachers were notified of how they would be assessed in the programme. At the end of the programme, the teachers would receive a certificate that confirms their status as competent or incompetent, and the status was granted based on numerous factors such as attitude (attendance, participation), knowledge (summative test) (Lisdiana et al., 2018), and skill (coursework, performance during on-the-job training, and observation checklist in class) (Handayani et al., 2018). In general, this programme aims to build the learning process and improve teachers' competencies through coaching teachers in planning, implementing, and evaluating students on an orientation to improve students' competencies through a higher-order thinking skill approach. However, it was feared that this programme only promotes surface learning because surface learning tends to occur when learning is in isolation, where knowledge and practice are not integrated, and teachers are isolated from a learning community (Redmond et al., 2008). Shulman (2005) argued that the education programme has a high probability of developing professionalism and CPD is perceived as "teachers' learning" (Postholm, 2012, p. 405) deeply rooted in the adult learning theory that advocates long-life learning (andragogy), where teachers are expected to construct their meaning (constructivism) (Sia and Cheriet, 2019). Shulman (2005) believed that developing professionalism should be habitual, routine, visible, accountable, interdependent, collaborative, emotional, unpredictable, and affect-laden. Therefore, Ravindran et al. (2021) believed that there are three stages to emerge from the professional development approach consisting of developing practical insights on knowledge elements of knowledge, practices, and beliefs of teachers in teaching the topics they teach. Thus, it means that they have formed their personal values, beliefs, and attitudes on the subject being taught at the end of the process. Furthermore, Shulman (2005) believed that there are three dimensions of instructional strategies in developing values, beliefs and attitudes on the subject being taught, which consist of surface, deep and implicit structure. Surface learning involves the operational elements of teaching and learning, how lessons are organised, and how teaching is done within a particular discipline (Eaton et al., 2018). Deep learning delves into the

assumptions educators make about how knowledge is best learned and how to encourage the practitioner to think like a professional (Eaton et al., 2018). Finally, the implicit structures include the moral aspects of teaching and learning in a given discipline, including beliefs, values, and attitudes (Eaton et al., 2018).

In general, the NTP is part of CPD. A study on the document shows that this programme is a massive programme involving thousands of teachers as core teachers, where they will train their colleagues based on the requirements set by the government. The strategy of this program is to conduct regular meetings with the core teacher and their colleagues using in-service training and on-the-job training strategy for 30 days and 82hours of training in the zoning areas. This programme seems to adopt the cascade model to reach the big number of teachers. Technology is involved in this programme with the Moodle application to deliver material and content even though the details are hazy in the collaborative efforts during the on-the-job training position. This program is expected to carry significant value for the teachers in the future, but there are still fears that linger on the issue that learning is only done on the surface.

2.4.4 The Performance of Teacher Working Group to Continue Professional Development

There is no specific term in the Professional Learning Community (PLC). The PLC integrates and functions within the school strategic framework and considers the specific school's vision, mission, and values to achieve school goals (Hairon & Tan, 2017). Examples of this can be seen in the teacher collaboration in Chinese schools, the Jiaoyan Zhu, and Beike Zhu programmes (Hairon & Tan, 2017). In Indonesia, PLCs are divided into several levels (Kemdiknas, 2010). For instance, teachers who teach in primary schools are included in either of these groups: '*Kelompok Kerja Guru*' (Teacher Work Group (TWG)), '*Kelompok Kerja Kepala Sekolah*' (Professional Learning Communities for Head Teachers), '*Musyawarah Guru Mata Pelajaran*' (Professional Learner Communities based on Subject), and '*Musyawarah Guru Bimbingan Konseling*' (Professional Learning Communities for Counsellor Teacher). These communities are independent and professional (Kemdiknas, 2010). Murniati et

al. (2019) described TWGs as the organisations/associations of classroom teachers. The subjects are domiciled in certain sub-districts and they are grouped in a cluster. Moreover, the number of teachers involved in any PLC reaches up to 100 people, and it depends on the coverage of the areas of the villages (Murniati et al., 2019).

The teacher working group (TWG) is part of a national framework to assist teachers in getting help from teachers to gain knowledge (Kemdiknas, 2010). The TWG is a group of teachers situated in the same particular geographic region (Ragatz et al., 2015), who work together using a structured process of inquiry that focuses on a specific area of their teaching to improve learner outcomes and to raise the school standards (Ragatz et al., 2015). This forum is to foster teachers' professional abilities, training, and exchange of information in a particular subject in accordance with the demands of the development of science and technology (Depdiknas, 2008). Furthermore, teachers collaborate to develop their competencies by sharing thoughts and ideas, creating tests, and developing self-development programmes for themselves and their communities (Husna, 2016). It seems like this community develops teacher skills and knowledge through collaboration between teachers in getting knowledge and improving their knowledge. As a result, teachers build their knowledge through social and community-based activities.

Social constructivism has a significant impact on TWGs. Social constructivism was initiated by Vygotsky in 1978. He emphasised the interaction of social, cultural-historical, and individual aspects as the key to developing proficiency in a society (Silalahi et al., 2022). A person basically builds his own knowledge by connecting his past knowledge with new knowledge (Vygotsky, 1978), and knowledge construction occurs when a person interacts with other people to exchange and confirm understanding so that a new knowledge consensus emerges (Silalahi et al., 2022). The social constructivism approach emphasises the social context of learning by stating that knowledge is built and constructed mutually. As a result, social constructivism is one of the fundamental foundations for teachers to collaborate and learn together in order to understand and improve themselves and their members, which is shown on TWG activities as part of CPD (Depdiknas, 2008). In TWG, we look

at how social constructivism works. Their programmes and activities are designed to address their needs and provide assistance. MoEC RI mandated that the programme created should be elaborated when their members and colleagues refer to their need and analysis assessment (Kemdiknas, 2010). There are some procedures that need to be followed in the preparation of the TWG programme and activities that refer to social situations and communities based (Kemdiknas, 2010). In the end, it will change the habitual action of a teacher to be a professional teacher (Depdiknas, 2008).

Moreover, TWG refers to Lave and Wenger's 'communities of practice' (CoP), which focuses on the relationship between learning and the social situation in which it occurs. CoP conceptualises that learners participate in 'communities of practice' and acquire knowledge and skills through newcomers moving from 'legitimate peripheral participation' toward 'full participation' in the sociocultural practice of a community (Hindi et al., 2022). CoP creates potential "curriculum" in the broadest sense - which may be learned by new learners with legitimate peripheral access and strong goals for learning because learners, as peripheral participants, can develop a view of what the whole enterprise is about, and what there is to be learned; as a result learning activity appears to have a characteristic pattern (Lave and Wenger, 1991). TWG on operational is divided into small communities of components (level, grade or subject matter) by giving help to members through mentoring, supporting, and briefing cross-members with or without budget from the government (Depdiknas, 2008; Resmini, 2010). TWG created "curriculum" potential in supporting CPD of teachers referring to situation and problem-based learning (Depdiknas, 2008). TWG regularly refers to events that teacher learning with social situations under certain conditions (Depdiknas, 2008). In a TWG event, a teacher can perform a basic task and observe another teacher performing according to their purpose (Depdiknas, 2008). This situation is similar with CoP where teachers observe and perform basic tasks at the periphery of the community (Hindi et al., 2022). Through active participation and engagement, they become more skilled, assume more responsibility, and therefore, move into a more central position within the community (Hindi et al., 2022). Learning in CoP is viewed as a series of collective, relational, and social processes rather than an individual's acquisition of knowledge (Hindi et al., 2022). This community is part of the reflective

practise for teachers to develop their knowledge and skills. Personally, teachers will be encouraged by TWG through many activities relevant to their profession (Depdiknas, 2008). The programme always refers to efforts to improve teacher competence and professionalism (Kemdiknas, 2010). The TWG is a forum to stimulate teachers' professional abilities and exchanging information in a particular subject in accordance with the demands of the development of science and technology (Resmini, 2010). Therefore, TWG can be a place for communities of practice.

Furthermore, the membership of TWG includes all teachers in a particular cluster, regardless of government teachers and non-government teachers, and they teach classes and certain subjects in a specific sub-district under the auspices of the Ministry of Education and Culture (Murniati et al., 2019). As a result, the group has a mix of teachers from different statuses, ages and teaching experiences. However, Putri (2015) believed that a smooth teacher working group would be influenced by a smooth line of communication that occurs in formal and non-formal, either vertical or horizontal.

The government of Indonesia has revitalised the teacher working groups through the Ministry of Education and Culture. Several guidelines and standards were outlined to guide the TWGs, including introducing regulations such as books on Operational Standard TWG and Book on Procedure Operational Standard Develop Curriculum on TWG (Nasional, 2008; Kemdiknas, 2010; Resmini, 2010). Those operational books will get recognition and assessment from the government (Kemdiknas, 2010). In essence, the Government of Indonesia hopes that the TWG would enhance teachers' competencies (Resmini, 2010). Many studies showed 'how effective TWG is in assisting to improve the knowledge and skills of teachers (Husna, 2016). Additionally, Thomas et al. (2017) explained five common characteristics of effective TWGs: sharing a common view of the mission, reflecting on practice, participating in the reflective discourse, offering feedback to one another on instruction, and keeping student learning central focus.

The TWGs can bring numerous benefits, but most importantly, if done well, the TWGs can improve learner outcomes (Hord, 2013) and improve teacher competence, teachers' professional learning, and the learning process (Hord, 2013; Murniati et al., 2019). The World Bank (2015) described the TWGs as giving different learning and experience in continuing professional development, especially to create workshops, training, and seminars compared to the traditional programme. In addition, the networks of the TWGs (between and across schools) enable the groups to widen their expertise and share their most effective practice (Hord, 2013). These are the benefits and advantages of the community of TWG to improve teachers' professional learning and learning process. This benefit prompts the government in Indonesia to initiate the NTP through the TWGs (Lisdiana et al., 2018).

However, there are gaps between ideals and realities in implementing the improvement of the competency and the delivery of CPD of teachers through the TWGs. Furthermore, the World Bank (2015) explains several limitations that can be attained by TWGs and the challenges to ensure an effective way to achieve its intended targets. It could have happened if their activities were less structured, and the teacher working group tends to depend on the limited skills of members, and therefore, they must be supported through outside expertise and external material. Moreover, motivation and working conditions sometimes can hamper the implementation of TWG (Murniati et al., 2019), and the biggest challenge among the majority of the TWGs in Indonesia is the absence of any result (output) or an end-test to examine the extent of knowledge acquiring (Ragatz et al., 2015). It seems that a breakthrough is needed to overcome the challenges.

To summarise, the TWG is one of the names of professional learning communities for teachers. This community is part of the national framework to assist teachers in obtaining knowledge to be a professional teacher. Social constructivism is one of the fundamental principles for creating TWG, a place for teacher interaction that teachers construct through interaction with others. Teachers interact with other members in their area to exchange and confirm their understanding to emerge with a consensus on new knowledge. In addition, the government of Indonesia has revitalised this group through the MoEC RI. The government understands that the TWGs bring many benefits for

personal teachers and students, even though there are gaps in reality and challenges in implementing continuing professional development through TWGs.

2.4.5 The Utilisation of Mobile Phone in the Teacher Working Group

Learning is an active process and negotiation between cultures, which can be regarded as an effective paradigm to incorporate collaboration and interactions into learning (Jie et al., 2020). It emphasises the cultural or social environments and interpersonal connections in the process of educational activities. Those processes can be helped through technology. Jie et al. (2020) argued that teachers have to update pedagogical concepts with enhanced technological knowledge to meet the demands of education in the digital era. Thus, technology is playing a part in improving teachers' knowledge and skills in the process and facilitating learning in an effective paradigm to incorporate collaboration and interactions into learning, in particular through their community.

Being a teacher requires one to move through the course of their job constantly, and mobile phones have become necessary for teachers to interact with people both beyond and within one's school, regardless of time and location, to access educational resources (Adning et al., 2019; Ally and Prieto-Blázquez, 2014). For example, professional discussions with colleagues to share hints and tips (Picton, 2019), consulting sessions among colleagues in group chats regarding teaching knowledge (Adning et al., 2019), reviewing supporting research with the experts (O'Bannon and Thomas, 2014), and accessing expertise outside of their range (Aubusson et al., 2009). Learning as an active process and negotiation between cultures can be regarded as an effective paradigm to incorporate collaboration and interactions which emerge through the social constructivism approach. Recently, the features on mobile phones have become common tools in teaching, learning, working, and leisure (Adning et al., 2019). Moreover, many experts describe the mobile phone as part of mobile learning, a learning process mediated by handheld devices such as smartphones (Ilic, 2013; Kearney et al., 2015; Naismith et al., 2004).

Aubusson et al. (2009) described that the mobile phone is ideally suited to teachers as it provides a process of learning for professionals that is different from their common working and learning context. It is similar to the mobile phone phases that focus on

the learner's mobility, where the character of the mobile phone is seen from the focus of a design or the appropriation of learning spaces and on informal learning and lifelong learning (Pachler et al., 2010). Pachler et al. (2010) determined that there are three phases of mobile learning in history, consisting of the first phase which focuses on the device, the second phase which focuses on learning outside the classroom, and the third phase focuses on the mobility of the learner. The features and functions of mobile phones should facilitate content creation, student-centred learning, collaboration, authentic learning, differentiation of instruction, and assessment and reflection (O'Bannon and Thomas, 2014). These phases have three important affordances that can be distinguished: mixed reality learning, context-sensitive learning, and ambient learning (Pachler et al., 2010). Generally, in the third phase, the learners are enabled to construct content and 'place' it in context using mobile devices where other learners can access and add to it, then participate in a media-rich environment rather than viewing the learner as a consumer of content, as well as enabling learners to engage in meaning-making through interactive practice (Pachler et al., 2010). Therefore, value and character are developed using mobile devices which reflects the teacher personally in using mobile phones.

However, as described above, membership in the teacher working group involves a variety of ages, statuses, and teacher experience. Prensky defined the period of teacher refers to the time when the digital age began, when the divide occurred, and then the adaptation to new or emerging technologies (Howlett and Waemusa, 2018; O'Bannon and Thomas, 2014). He categorised teachers below 35 years of age (born from 1982) as Digital Native teachers (DNs), while Digital Immigrant teachers (DIs) are those above 35 years of age (born before 1982) (Howlett and Waemusa, 2018). For example, the ability to use a mobile device. Referring to Howlett and Waemusa (2018), who studied how teachers rated their ability to use technology from novice to expert (the Dreyfus model of skill acquisition), it was found that the ability of DNs is "proficient" compared to DIs who are competent. The scale indicates that DNs have a deep understanding, see actions holistically, and routinely achieve a high standard compared to DIs (Dreyfus and Dreyfus, 2005). Moreover, when the study asked, "I can use mobile devices with ease", there was a significant difference between DNs and DIs, as DNs felt significantly more confident in using mobile devices than DIs. A

similar study in Indonesia showed results which indicate the data about the junior teachers perceived themselves as experts (63% of the respondents) in using a mobile phone, and they rated themselves higher than senior teachers (23%) (Adning et al., 2019). The scale indicates that junior teachers have an authoritative or deep holistic understanding, intuitively deal with routine matters, go beyond existing interpretations, and achieve excellence with ease. They can take responsibility for going beyond existing standards and creating their interpretation (Dreyfus and Dreyfus, 2005). Both scales in technology generally show that those teachers have a good understanding of using technology, holistic action in technology, routine matters with technology, and the capability to create their own interpretation in technology.

The rapid technology on mobile phones toward smartphones has assigned odds for people to communicate and do other activities. In particular, the dimensions of the messaging applications are rooted in mobile phones and are specifically designed for mobile phones (WhatsApp, BBM, Line, Facebook), which can be identified as mobile-based social networks, and have become popular (Cetinkaya, 2017). It means that applications have eased the interaction between individuals and groups, provided various opportunities for social feedback, and supported the formation of complicated social relations, thus showing how enormous people's want is for these networks (Cetinkaya, 2017). Another study provides the latest insight into young people's attitudes towards writing. Most young people write regularly, and young people most frequently write on technology-based materials, such as text and instant messages (Susilo, 2014). In contrast, senior people have much less passion for the features of the mobile phone and find the barriers to be more problematic (O'Bannon and Thomas, 2014).

Ilic (2013) suggested three main elements in the mobile phone framework; personalisation, authenticity, and collaboration. The first elements of personalisation can help the learner to personally dictate his or her own pace and time of learning. Any activities of delivering content, texting, and responding to feedback, including the time spent on learning material and decisions, are at the learner's hands. Ilic (2013) separated personalisation in the mobile phone with personalisation by e-learning, especially in recognising the context and history of each learner and the delivery of learning that the learner dictates at any time and place. The next element is

authenticity. Ilic (2013) believed that authentic learning provides real-world relevance where it can be defined in terms of a) tasks, b) roles, and c) context. The situation on the mobile phone should reflect real problems from the real world, and it can be perceived in the practices that are carried out and the value of these practices. It was suggested that mobile phones should create relevant and interesting learning activities based on problem-based lessons or projects such as in the MyArtSpace project, where children used mobile phones to explore museums and collect audio, photos, and text notes related to museum content which could be discussed later in class (Ilic, 2013). The last element is collaboration. Learners need to have a platform to communicate and discuss. Mobile phones have successfully created numerous tools to open learning collaboration through recording, organising, and reflecting on learning. In addition, Ilic (2013) described that mobile learning enables learners to learn regardless of distance through mobile data collection and sharing, support transmission and delivery of rich multimedia content, and links can be made to both inside and outside the school.

A few studies have examined TWGs in which technology integration was included in a collaborative community (Cifuentes et al., 2011; Curwood, 2011). For example, the latest study by Thomas et al. (2017) involved one group of fifth-grade teachers working within a teacher working group framework (TIPC framework), where the purpose of this program is to set instructional goals and change their thinking and actions. The study shows that teachers were able to overcome several barriers to technology integration, in the way that teachers were able to work collaboratively or they gathered a few of their colleagues to solve the problem together, and this may be adapted to fit various teaching and learning situations (Thomas et al., 2017). The result shows that teacher working groups provided teachers with a space to engage in dialogue around content, technology, and student learning outcomes (Thomas et al., 2017). Furthermore, a recent study shows that teachers face barriers in using technology to support literacy that stemmed from an attitude related standpoint, as most teachers cited lack of hardware, software and Wi-Fi, finances and outdated or insufficient hardware as the top three barriers in using technology to support literacy in the classroom (Picton, 2019). In addition, almost a quarter of respondents said they had no training (neither initial nor ongoing) in the area of using technology to support

literacy learning. More than a fifth said that while they did not hold any educational technology-related qualifications, they would like to (Picton, 2019).

In general, the mobile phone has become necessary for teachers to interact with people or colleges. Furthermore, the mobile phone has become ideally suited to teachers as it provides a process of learning for professionals that is different from their common working and learning context. However, the capability and skill of junior teachers or digital natives are more proficient and expert in using the mobile phone. Furthermore, a few studies have examined teacher working groups in which technology integration was included in a collaborative community even though it did not specifically use a mobile phone, but technology gives space to engage in dialogue around content, technology, and student learning outcomes.

2.5 The Potential of Mobile Phone in Continued Professional Development

MoEC RI specified the definition of CPD as a measure to reduce the gap of knowledge, skills, social competence, and personal capabilities that the teachers have to keep up with future demands (Al Rasyid, 2015). Many experts argue that technology has enormous potential to enhance this process (McAleavy et al., 2018). One of the enormous potentials of mobile technology is a mobile phone, which is the focus of this research. The rapidly expanding usage of mobile phones has led to an influence in the education field, which indirectly influences society's development knowledge, particularly for the teachers' community (Adning et al., 2019; McAleavy et al., 2018; Picton, 2019). Moreover, continued teacher professional development, mediated by mobile technology, can engage teachers directly and circumvents the often-cited weaknesses of off-site workshops and the indirect model (McAleavy et al., 2018). This view is supported by UNESCO that recommends mobile phones be integrated into mainstream teacher credentialing programmes and constitute a pillar of the CPD effort (McAleavy et al., 2018; Miao et al., 2017). Commenting on UNESCO recommendation, McAleavy et al. (2018) believed that mobile technology has potency on practicality, specificity and continuity on teacher professional development. For instance, the practicality potency of mobile technology has demonstrated that it makes a range of school-based learning possible, whereby technology is more powerful than traditional

off-site workshops (McAleavy et al., 2018). Additionally, mobile technology can give teachers access to comprehensive digital resources related to particular aspects of the school curriculum and specific subject-related pedagogy (McAleavy et al., 2018). In the continuity aspect, technology can provide cost-effective ways of supporting coaching relationships and professional learning communities so that professional development takes place within a framework of continuous and sustained reflection (McAleavy et al., 2018). Polly and Hannafin (2010) suggested that technology can improve continued teacher professional development in training by allowing teachers to pick information and activities that encourage them to embrace new pedagogical practices offered in training.

Burn and Lawrie (2015) are optimistic that CPD can be provided and enhanced in low-income countries and fragile states through seven key recommendations, one of which highlights the role of technology. They recommend using information and communication technology (ICT) to access material, professional development, and professional learning communities for professional development (Burn and Lawrie, 2015). Meanwhile, Ravindran et al. (2021) pointed out that the CPD of teachers emerges through a three-stage approach consisting of developing practical insights on content elements of knowledge, practices, and beliefs of teachers in teaching the topics they teach. Thus, it means that they have formed their personal values, beliefs, and attitudes on the subject being taught at the end of the process. Shulman (2005) supported Ravindran et al. (2021) that developing values, beliefs and attitudes on the subject being taught should consist of surface, deep, and implicit learning structures. Furthermore, a broader perspective has been adopted by Faranda et al. (2021), who argued that learning has two levels of processing, namely surface and deep, to explain how learners intentionally direct attention towards learning materials to achieve the desired outcome.

In addition, Shulman (2005) described in more detail how a surface, deep and implicit structure is implemented as a new profession to develop teacher professional development. Firstly, the surface structure refers to "concrete, operational acts of teaching and learning, of showing and demonstrating, of questioning and answering,

of interacting and withholding, of approaching and withdrawing" (Shulman, 2005. p54). Eaton et al. (2017) argued that the surface dimension is involved in teaching and learning how lessons are organised and how teaching is done with a particular discipline. In the same vein, Faranda et al. (2021) noted that the reproduction of knowledge marks the surface approach, often through rote memorisation, to avoid failure. Similarly, Entwistle and Waterson (1988) demonstrated that surface processing within the cognitive dimension has several actions such as repeating the statement of a problem without quotes or interpretation, repeating what was said without adding new elements, using ideas or concepts that were presented, without adding personal comments or advancing the idea, proposing solutions without explanations, judging without justifying, asking questions about the information that is irrelevant to the problem or that do not contribute to its understanding, and proposing several solutions and refraining from indicating the most suitable solution. These definitions describe surface learning.

Secondly is the deep structure that reflects a set of assumptions about how best to impart a certain body of knowledge and the know-how or how to acquire knowledge (Shulman, 2005). In the education field, it means how to delve in the assumption that teachers "make about how knowledge is best learned and how a developing practitioner learns to think like a professional" (Eaton et al., 2017, p.7). For example, teachers select a methodology based on the students' characteristics to impart knowledge professionally. Similarly, Entwistle and Waterson (1988) illustrated that deep processes within the cognitive dimension can be shown by several action capabilities such as action to connect facts, ideas and concepts to interpret, propose or judge, action to propose new elements of information, action to create new information from information that was collected, using hypotheses and quotes, action to develop new strategies with a wider framework, and action to handle a problem in a wider perspective. There is an unambiguous relationship between Entwistle and Waterson (1988) and Shulman (2005) where learners show the capability to understand knowledge by acting in a wider perspective due to the in-depth understanding of knowledge. The last dimension is regarding the implicit structure, "a moral dimension that comprises a set of beliefs about professional attitudes, values, and dispositions" (Shulman, 2005. p.55). Eaton et al. (2017, p.7) stated that the focus

in this dimension is "the moral aspects of teaching and learning in a given discipline, including beliefs, values, and attitudes." The implicit structure is the higher level of learners to immerse the knowledge for their body as values and attitude of professional action.

Furthermore, McAleavy et al. (2018) pointed out that mobile technology supports teachers' professional development. Several case studies demonstrated the remarkable potential of mobile phones to be used in different ways to support effective teacher professional development. The latest study by UNESCO showed an intervention in Pakistan for pre-primary school teachers in remote rural areas who use mobile technologies to reach a group with previously limited opportunities for training (Miao et al., 2018). The finding shows that the mobile phone had proven to reach remote regions, and mobile phones offer an opportunity to quickly scale up to professional development in a particularly cost-effective way (Miao et al., 2018). This study reflects that mobile phones have a high possibility to improve the reach, scalability and flexibility of teacher professional development (Miao et al., 2018). This view is supported by McAleavy et al. (2018), who wrote that mobile devices present particularly significant opportunities to extend the reach and scale of professional learning, particularly for developing countries. Another research focused on mobile phone and teacher development, which stressed the desirability of social and collaborative learning among peers, was presented by Cordingley et al. (2015) and Darling et al. (2017). The finding shows that mobile technology offers the possibility of collaboration among communities of teachers who are dispersed geographically and can connect distant experts with both face-to-face and virtual learning communities of peers on peer learning, involving external professional inputs (Cordingley et al., 2015; Darling et al., 2017).

Although extensive research has been carried out on mobile phones, no study has shown that mobile phones alone are sufficient in teacher professional development. McAleavy et al. (2018) believed that mobile phones alone will not improve teacher professionalism. In the same vein, Meldenhall (2017) noted that mobile technology should be used to supplement and not take over critical face-to-face teacher

professional development activities. A broader perspective adopted by McAleavy et al. (2018) argued that mobile phones alone are not sufficient when used for professional development; it should be not just one component in a blended method to accompany face-to-face elements. The majority of the case studies on mobile phones have emphasised the need of combining teacher professional development via technology with face-to-face features (McAleavy et al., 2018). This point of view emphasises that teacher professional development via mobile phones needs to be combined with face-to-face elements.

In general, there is an optimistic view that teacher professional development can be provided in developing countries highlighted by technological assistance. The mobile phone has enormous potential to improve teacher professional development. The teacher professional development emerges through developing practical insights on teachers' knowledge, practices, and beliefs in teaching the topics they teach. Therefore, professional development becomes visible when they have value, belief and attitudes on the subject being taught through the surface and deep learning process for teachers. Furthermore, there is an opportunity to harness the power of mobile technology to support teacher professional development shown by many studies. Even though no single study said that mobile phones alone are sufficient in teacher professional development, mobile phones should be used to supplement the learning process, blended with face-to-face elements.

2.6 The Conceptual Framework Mobile Phone Work into National Framework

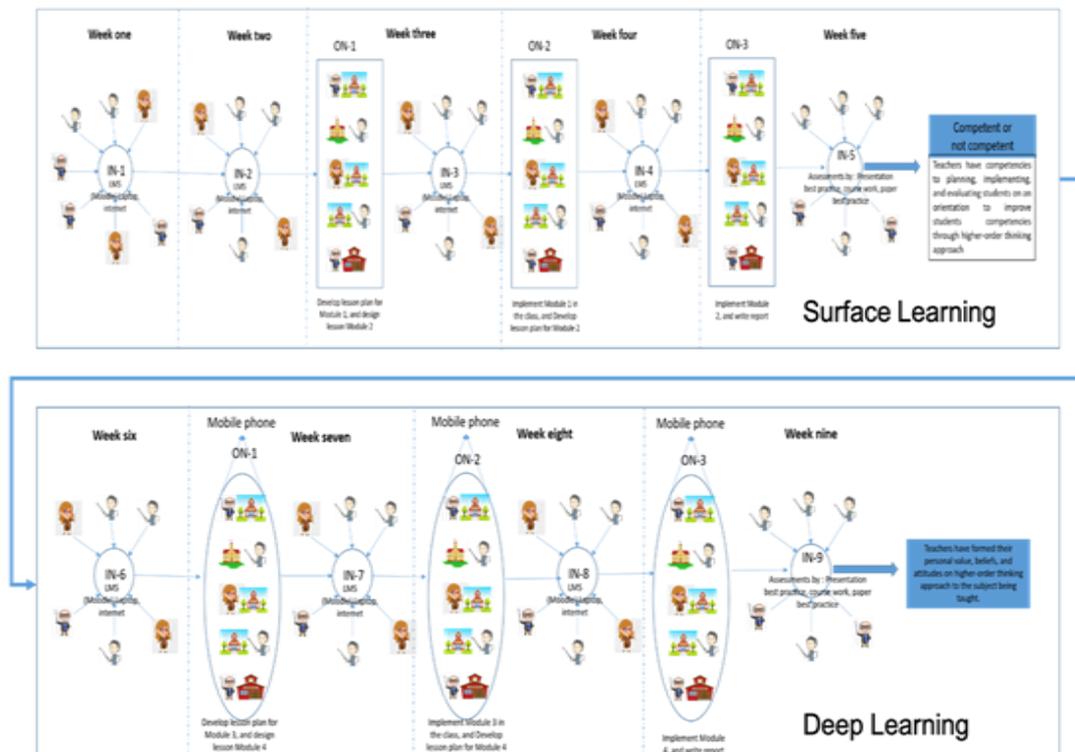
This subsection explores the probability of mobile phones to assist teacher professional development through activities for continued professional development in the national framework. The MoEC RI created the NTP with the cascade model to achieve a domino effect in regard to improving teacher skills. The MoEC uses the teacher community base in the process to disseminate knowledge regarding higher-order thinking skills. However, the system of the NTP requires that the government only create training in a district or city zone for several reasons. Even so, the government hopes the impact can continue in TWG.

Social constructivism is one of the fundamentals of philosophy in developing TWG. This study tries to approach the topic under investigation by combining social constructivism and technology as a theoretical framework. However, this study focuses on individual teachers in the process of learning higher-order thinking skills through mobile phone action rather than looking at groups of teacher community, with the researcher applying the Shulman technique to grow teacher knowledge till deep learning. Thus, a broader perspective was adopted in this conceptual framework where mobile phones have a high potential to improve the reach, scalability, and flexibility of teachers' continued professional development.

Mobile phones are not a single element to improve teacher professionalism with a blended approach and face-to-face elements. (Meldenhall, 2017; McAleavy et al., 2018; Miao et al., 2018). Moreover, this concept is explored through two main activities: the NTP and knowledge exchange in TWG. The purpose of the NTP is to build a learning process and improve teachers' competencies through coaching in planning, implementation, and learning evaluation with an orientation to skill process for improving students' competencies with a higher-order thinking approach (Lisdiana et al., 2018). The NTP adopted the cascade model as the impact of the result.

Knowledge exchange in TWGs, known as the Dissemination Programme (DP), is a concept to explore value and belief of participants after the NTP by disseminating to other members in the TWG as the impact of deep learning (Figure 2-9). This is part of TWG activities where teachers learn and disseminate to their members as a social constructivism approach. However, this conceptual framework is intended for individual impact as Shulman mentioned in the deep learning of this topic.

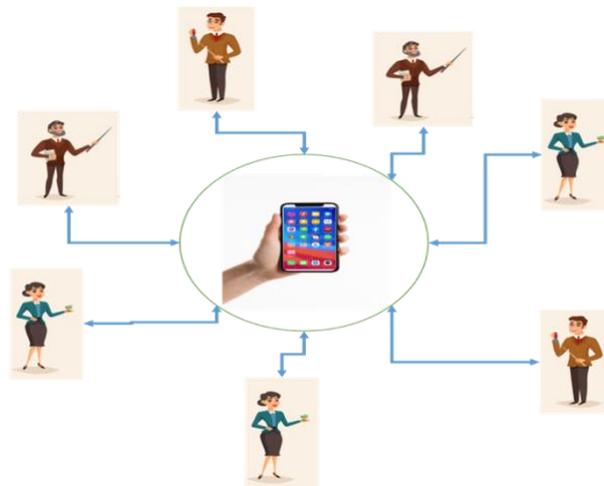
Figure 2-9 Framework in the NTP and DP Through Mobile Phone



The researcher breaks into several rounds, all relating to developing professional development. The idea is that the NTP should act as a part of surface learning. In this step, teachers would get a block of concrete and operational concepts regarding higher-order thinking skills. The dissemination program (DP) through teacher working group activities is the next part of deep learning to inculcate this behaviour. The activities would be conducted in-depth, habitually, and routinely, and teachers have the power to decide what knowledge they need to share and examine to improve the subsequent knowledge by using the same system, platform, and content from the government. The extra application from the mobile phone becomes an additional platform. The platforms suggested are the common and familiar platforms for the members (WhatsApp, Facebook, email). Thus, this platform should be habitual, routine, visible, and accountable for them. In-depth collaboration through mobile phone platforms may hope to assist to emerge values, beliefs and attitudes on the subject being taught, which is shown by habitual sharing, discussion, asking and answering and searching knowledge through mobile phones. Moreover, mobile phones will be the central communication for collaboration between teachers, core teacher and their peers. Hopefully, a collaboration between teachers is an integral part

of these steps. During training, teachers would perform the regular activity; but they must report what they learn, find, and share on mobile phones. At the end of the programmes, the teacher gets value, morals, professional attitudes, and dispositions to teach higher-order thinking skills in class.

Figure 2-10 Framework of Collaboration Teachers in the NTP and DP in TWG
Through Mobile Phone



This conceptual framework as shown in Figure 2-10 can support the government goal. The government hopes that teachers get the program's value and consider adding them to their teaching repertoire. It is shown on the goal of utilising the NTP programme to make learning oriented to higher-order thinking skills from planning, implementation to assessment (Khaer, 2019). However, to get the value of this NTP in the long term, teachers must have the discipline to embody the habitual, routine, visible, accountable, interdependent, collaborative, emotional, unpredictable, and affect-laden characteristics and should not stop when the program is over. Berge and Muilenburg (2013) believed that knowledge is a state of mind, a set of beliefs, as an object or process to guide future actions or to maintain current abilities, or as a set of boundaries to understand information and to determine what information is needed to make a decision. In addition, Boitel and Fromm (2014) argued that developing value in professional development should be "*pervasive, routine and habitual*". Besides, the mobile phone has the potential to facilitate peer support, collaboration and creation of communities of practice (McAleavy et al., 2018). It means that pervasive, routine and habitual action can be developed by mobile phones. However, the success of

professional development through mobile phones depends on the quality and relevance of the technology teachers use and mobility of teacher using a mobile phone. In this study, the conceptual framework for mobile phone use is used to complement and not usurp critical face-to-face teachers to continue professional development activities. Therefore, this conceptual framework emphasises the need for a mix of professional learning via mobile phone combined with face-to-face elements from the national framework of this study.

2.7 Summary

This chapter reviewed the literature by criticising the education system in Indonesia with special emphasis on professional teachers, CPD and teacher working groups. Hence, the chapter presented the existing scholarly work related to the study. Sufficient details and analyses were explained regarding CPD in teacher working groups through mobile phones. In addition, utilising mobile phones to support professional development had been detailed to serve as a foothold in developing teacher knowledge as CPD in TWG activities. Also, the chapter explained conceptual perspectives that underpin the research. The next chapter describes and justifies the research design followed by the research conduct.

Chapter 3

Research Design Overview

3.1 Chapter Outline

This chapter discusses the theoretical background concerning the methodological choices in determining the research design, informing the data collection, analysis and development of theory to answer the research question. This step is important to define the scope and limitations of the research design and to explore research on the use of mobile phones based on the research design. In order to achieve this, the chapter is divided into several sections. The first section clarifies the design of the research and methodology, while the second section describes the research participants and the methods employed to attract them. The third section outlines the ethical concerns related to the research and how these were controlled. This is followed by the fourth section which describes the actions taken to ensure the validity and reliability of the collected data. The fifth section is a detailed explanation of the qualitative data collection and analysis.

3.2 Research Design

This study is a qualitative research based on a case study with a single-case design. The study was conceived during a training situation with the teacher community to disseminate knowledge exchange during continuing teacher professional development on the national framework programme. In addition, this research is a piece of social research to explore and understand the meaning that individuals or groups attribute to a social or human problem (Creswell, 2017). There are possibilities to examine this theory through narrative, phenomenology, ethnography, case study, and grounded theory. (Creswell, 2017). However, the complex environment and situation highlighted in this study looked at 'how teachers' perception concerning the use of mobile phones and explore knowledge exchange of teachers in aiding their continuous professional development in the rural area'. This study discusses the issue of 'how mobile phones bridge the gap and help overcome issues of geographical

isolation to handle the difficulties experienced by teachers in teacher knowledge in the Indonesian national programme’.

The research issues above lend themselves to a method case study approach, with the majority of research questions referring to "how" and "why" questions. Yin (2014) identified the requirement to use case studies when the main research questions are "how" or "why" questions, has little or no control over behavioural events, and the focus of the study is a contemporary phenomenon. Therefore, this study adopted a case study approach to give insight into the nature of the research situation, an in-depth study of a contemporary phenomenon (the use of mobile phones), in a complex environment (rural areas and TWG communities), where a variety of stakeholder perspectives are sought. This research aims to systematically investigate an event or a set of related activities with the specific aim of describing and explaining one phenomenon (Lune and Berg, 2017). Besides, this study focuses on a case or unit of analysis in a specific context, as described by Yin (2014) where a case study is the case or unit of analysis as a phenomenon occurring in a bounded context, which the researcher focused on the use of mobile phones by teachers in rural areas in TWG activity as a contemporary phenomenon.

Furthermore, a case study collects detailed information using various data collection procedures over a sustained period (Lune and Berg, 2017). The benefit of this method is the ability to open the way for discoveries (Lune and Berg, 2017). However, when considering the scientific value of case studies, two points should be addressed. First, the case study should offer a reliable and repeatable result. Second, there is value in the case study beyond the individual case. Moreover, Ilic (2013) described one common problem associated with case study research; researchers frequently try to answer questions that are too broad to be contained for one study. In order to avoid this problem, several authors, including Yin (2014), Stake (1995) and Ayubayeva (2018), suggested placing boundaries on a unit of analysis to prevent this from occurring. Others also suggest how to limit a case, including by time and place (Creswell, 2017), time and activity (Stake, 1995), and definition and context (Aubusson et al., 2009). Selecting a particular type of case study is also important because this is related to the study purpose, which could then describe a case, explore a case, or compare cases (Ilic, 2013). Lune and Berg (2017) categorised case studies as

explanatory, exploratory, and descriptive. An explanatory case study is a case study to explain how or why some condition came to be (e.g., how or why some sequence of events occurred or did not occur) (Yin, 2014), and is used when researchers seek to explain the presumed causal links in real-life interventions that are too complex for the survey or experimental strategies (Ilic, 2013). Particularly, in a complex study of organisations or communities, it may be desirable to use multivariate cases to examine the plurality of influences (Lune and Berg, 2017). Moreover, the researcher may have little preliminary knowledge of the issue or little knowledge of it (Thomas, 2011).

Conversely, an exploratory case study identifies the research questions or procedures used in a subsequent research study, which might or might not be a case study (Yin, 2014). It is used to explore situations in which the evaluation intervention does not have a single clear set of outcomes (Ilic, 2013). From Luna and Berg's (2017) perspective, a case study must have some organisation framework designed before beginning the research. Also, fieldwork and data collection may be undertaken before defining a research question when conducting exploratory case studies (Lune and Berg, 2017). However, as Yin (2014) also pointed out, the goal in these studies may be justified when they seek to discover theory through directly observing some social phenomenon in its natural and raw form. The last category is the descriptive case study. This study is used to describe an intervention or phenomenon and the real-life context in which it occurred (Yin, 2014).

Lune and Berg (2017) suggested that case studies can be usefully classified into three different types: intrinsic, instrumental, and collective. According to Stake (1995), the case itself is of interest in an intrinsic case study, where it is an unusual and unique situation, and the results will have limited transferability. In an instrumental design, the case is of secondary interest, and it can provide insight into an issue, a particular situation and phenomenon or help refine a theory (Ilic, 2013). Instrumental case studies are often investigated in-depth, where all aspects and activities are detailed but not simply to elaborate the case. Instead, the intention is to help the researcher better understand some external theoretical question, issue, or problem (Lune and Berg, 2017). Collective case studies are also known as multiple-case studies, cross-case studies, comparative case studies, and contrasting case studies (Stake, 1994, 2000, 2005; Gerring, 2006; Merriam, 2001). Collective case studies involve an

extensive study of several instrumental cases intended to allow better understanding, insight, or perhaps improved ability to theorise on a broader context (Lune and Berg, 2017).

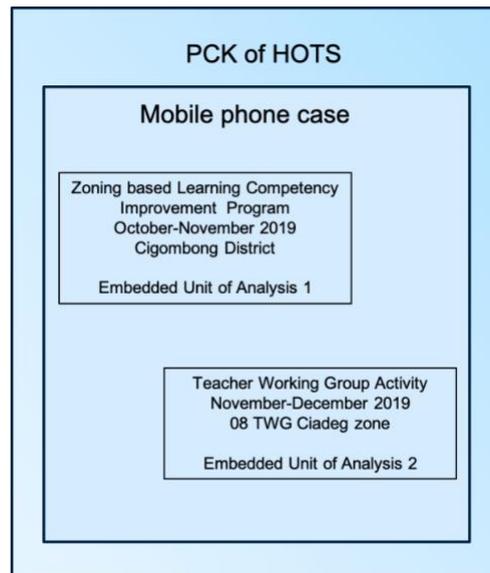
There are four types of design case study that would potentially help in constructing a stronger and easier study, namely (Type 1) single-case (holistic) designs, (Type 2) single-case (embedded) designs, (Type 3) multiple-case (holistic) designs, and (Type 4) multiple-case (embedded) design, enabling the researcher to explore differences within and between cases (Yin, 2014). Single case design looks at one case within a context or environment that is unique or extreme (Baxter and Jack, 2008). Ilic (2013) demonstrated that a single case design allows the researcher to look at sub-units situated within a larger case. However, in an evaluation study, the single case might be a public program that involves large numbers of funded projects—which would then be the embedded units. In either situation, these embedded units can be selected through sampling or cluster techniques, and no matter how the units are selected, the resulting design would be called an embedded case study design.

This study used a single-case (embedded) design involving more than one level unit and giving attention to a sub-unit or sub-units (Yin, 2014). It used an exploratory instrumental design based on the goal at the beginning of the study to understand how and why teachers utilise mobile technology for surface and deep learning of HOTS in the existing professional development programme and disseminated the knowledge to members of teacher working groups in a complex society and demography. Furthermore, this study investigated in-depth mobile phone activity during the training and activity in the teacher working group. However, the outcome was unknown to the researcher at that time of research.

In this study, the unit of analysis was bounded by time, area, and activity. The first is the area as the unit of analysis, and this study focused on one particular area in Cigombong District (West Java, Indonesia) as part of the rural area. The second unit is time, where this study relied on the framework of the government programme or the NTP. The third unit is the activity, which were two-unit activities to investigate the circumstances of mobile phones, involving teachers who enrolled in the existing NTP (Zoning based Learning Competency Improvement Program) with knowledge of

HOTS as a topic. The programme ran from October to November 2019, and several participants continued to disseminate the knowledge through the Dissemination Programme (DP) at TWG (Gugus 08) from November to December 2019. Thus, this study used a single-case (embedded) design involving more than one level unit with attention to a subunit or subunits, as shown in Figure 3-1 (Yin, 2014).

Figure 3-1 Embedded Case Study Design for this Research



To summarise, the research design is essential for the researcher to explore the role of mobile phones in teachers' professional development in unique conditions and environments. The majority of the research questions refer to "how" and "why" questions on the contemporary phenomenon of teachers using mobile phones in rural areas in TWG activity as a contemporary phenomenon. Therefore, the case study group was formed from one rural area in Bogor District, West Java, Indonesia (Cigombong Area), and this study investigated mobile phones in the exploration of knowledge by analysing the activities in the NTP (Zoning-based Learning Competency Improvement Program), including "how knowledge exchange was made through mobile phones in the NTP and the DP on TWG in rural areas". The purpose was to gain a deeper understanding of the processes, exchange knowledge and outcomes of learning activities conducted by teachers exploiting mobile devices in the existing professional development programme and disseminate the knowledge to members of TWG members in the rural area.

3.3 Participants

Most sampling in a qualitative research entails purposive sampling, a non-probability form of sampling (Bryman, 2012), and this study followed the same trajectory. Some experts call this category “judgmental sampling” (Lune and Berg, 2017). In this study, the researcher used special knowledge or expertise about some groups to select subjects representing this population, ensuring that the samples were relevant to the research questions (Bryman, 2012). However, there are three strategies in purposive sampling; theoretical sampling, generic purposive sampling, and snowball sampling. In this study, the researcher used snowball sampling to attract volunteers as samples. Snowball sampling is a sampling technique in which the researcher samples initially a small group of people relevant to the research question (Bryman, 2012). Moreover, these sampled participants proposed other participants who had experience or characteristics relevant to the research, and the process was continued until a sufficient number of participants had been recruited (Lune and Berg, 2017; Bryman, 2012).

Section 3.3 aims to portray volunteers and their requirements by the snowball strategy. Selected participants were the main point in this research by focusing on rural areas as the majority of the population in Indonesia, and primary school teachers are a significant population in the number of teachers in Indonesia (Indonesia, 2017). There are several steps to find participants in the scope of the study. The first step was to find a local administrator in rural areas around the capital city, namely Bogor Regency, with 40 districts and 250 teacher working groups (Disdikprolap, 2019). The researcher used indicators by examining the local authority through an interview, who was a high-profile teacher in an active teacher working group with any activity that matched the indicator and had weekly or fortnightly regular events, where the locations were rarely connected to broadband internet connection.

I: “In Bogor district, is there any teacher working group have a regular activity every week or once every two weeks with the location that is a little bit far from the city of Bogor where internet connection rare and part of Zoning based Learning Competency Improvement Program”.

SSI: *“Today, we are now gathering our colleague (leader of teacher working group) to sign the implementation contract with Zoning based Learning Competency Improvement Program (NTP). Several locations are far away, remote, and poor internet connection in Bogor District. There are several learning centres or teacher working group in the Ciawi region which seem to have the initiative to purpose one of them. Mr U, as leader of Ciadeg 08 teacher working group, has an active and regular activity for their members. Unfortunately, he couldn’t come because there is an activity in their group today, and the teacher core in this zone is Mr Supangkat, that you can contact them here”.*

The conversation above shows that the Bogor District Government (Bogor district) recommended that Gugus 08 Ciadeg Bogor District, called 08 Ciadeg teacher working group (08 Ciadeg TWG), as participants in this study. The recommendations were given because 08 Ciadeg TWG has weekly activities, located a bit far from the city with a mountainous topography, with probably infrequent connection to the internet. Thus, 08 Ciadeg TWG is a learning centre with a good opportunity and location to conduct this research. After determining the 08 Ciadeg TWG teacher community as the sample location of the study, the next step was to extract the common thread of 08 Ciadeg TWG with the National Training Programme. According to the interview with the staff of Bogor District Government, there were 27 zones in Bogor District that had NTP activities for teachers in grades 4-6, with the total of 540 primary teachers.

I: *“How many zoning for Zoning based Learning Competency Improvement Program for teacher grade 4-6 and how many participants each zone take part in these programs”.*

MY: *“... For grade 4-6 in Bogor District are separated on 27 nodes and each zoning will training 20 teachers, so total is 540 teachers at Bogor District”.*

Ciadag 08 is located in Ciadeg Village, a part of the Cigombong District. This district is part of the 27 zones that the local government determined for this programme. Cigombong Zone has seven TWGs as participants in the NTP, namely Gugus 06 Pasir Jaya, Gugus 05 Caringin, Gugus 07 Ciburayut, Gugus 02 Srogol, Gugus 01 Wates Jaya, Gugus 02 Cipelang and Gugus Ciadeg 08 (Table 3-1).

Table 3-1 List of Participants in National Training Programme in the Cigombong District

No	Initials	Teacher Working Group	Original School
1	SSS	Gugus 01 Wates Jaya	SD Srogol 03
2	NH	Gugus 01 Wates Jaya	SD Pangarakan 02
3	SS	Gugus 02 Srogol	SD Cibandawa
4	DH	Gugus 02 Cipelang	SD Cipelang 02
5	TW	Gugus 05 Caringin	SD Cikereteg 02
6	ID	Gugus 06 Pasir Jaya	SD Cisalada 02
7	LH	Gugus 06 Pasir Jaya	SD Cisalada 02
8	AR	Gugus 07 Ciburayut	SD Pangarakan 02
9	DL	Gugus 07 Ciburayut	SD Panyarang
10	MR	Gugus 07 Ciburayut	SD Citiis
11	RC	Gugus 07 Ciburayut	SD Citiis
12	AK	Gugus 07 Ciburayut	SD Ciburayut 02
13	VS	Gugus 07 Ciburayut	SD Panyarang
14	SSC	Gugus 08 Ciadeg	SD Ciadeg 04
15	EC	Gugus 08 Ciadeg	SD Ciadeg 06
16	II	Gugus 08 Ciadeg	SD Ciadeg 02
17	NW	Gugus 08 Ciadeg	SD Ciadeg 03
18	NK	Gugus 08 Ciadeg	SD Ciadeg 03
19	EM	Gugus 08 Ciadeg	SD Ciadeg 05
20	SC	Gugus 08 Ciadeg	SD Ciadeg 01

Table 3-1 shows that 20 teachers joined the NTP in the Cigombong District. The participants were from 16 primary schools around the Cigombong District, teaching in primary schools at levels 4-6. In addition, 16 primary schools came from seven TWGs around the Cigombong District. The 08 Ciadeg TWG had the most participants joining the NTP in the Cigombong District by sending seven teachers from around Ciadeg Village, and there were fewer participants from Gugus 02 Srogol which sent one teacher. Each school sent one or two teachers to join the NTP. The selected teachers were referred by several categories, as explained by the school supervisor:

AE: "...Who proposed the teacher as participants were from the local education officer in accordance with the school zoning. The selected teachers are the best teacher and are in the teacher working group on one zoning. The story was that you are the best teachers in your zones".

The school supervisor described the teachers who attended the NTP as the best teachers in their teacher working group and agents for their teacher working group. This view is supported by Khaer (2019), who said that the participants of the NTP are the best teachers in the subject with good communication (online or offline) to the headteacher, core teacher, and their members, and should be a member of the teacher working group. Therefore, teachers' sex, age, gender, and status are not considered when selecting participants. Even though Lisdiana et al. (2018) noted that the local government can select and give permission for teachers to join the NTP, it seems that the teachers in the Bogor District were professionally selected by referring to the guideline. As a result, the composition of sex, gender, status, and experience was ignored by the Bogor District which implied that there were open opportunities for all teachers to join the programme as long as they are the best teachers and agents for their teacher working group.

Therefore, this study had difficulties balancing the phenomenon of teachers from the perspective of demography (gender, age, and status) in using mobile phones within a national framework. Twenty teachers who participated in this programme were the first phase of this study to be analysed as respondents. Afterwards, seven 08 Ciadag TWG

participants from the 20 participants were chosen as another analytical unit, where they disseminated knowledge to members of the 08 Ciadeg TWG (Table 3-2).

Table 3-2 List of Seven Members of 08 Ciadeg TWG who Joined the NTP in the Cigombong District

No	Initials	Teacher Working Group	Original School
1	SSC	Gugus 08 Ciadeg	SD Ciadeg 04
2	EC	Gugus 08 Ciadeg	SD Ciadeg 06
3	II	Gugus 08 Ciadeg	SD Ciadeg 02
4	NW	Gugus 08 Ciadeg	SD Ciadeg 03
5	NK	Gugus 08 Ciadeg	SD Ciadeg 03
6	EM	Gugus 08 Ciadeg	SD Ciadeg 05
7	SC	Gugus 08 Ciadeg	SD Ciadeg 01

Table 3-2 above describes seven members of the 08 Ciadeg TWG who finished the NTP. These members of the 08 Ciadeg TWG were from six Ciadeg Village schools. Most schools sent one of their best and most active teacher to join the NTP. Furthermore, these seven participants had been mandated to disseminate their knowledge to the 08 Ciadeg TWG. This activity supports the government's purpose that teachers should implement and develop a learning-based orientation to higher-order thinking skills after finishing the NTP (Khaer, 2019). This activity was held for around one and a half months, from November until December 2019. The participants who participated in this programme were the second phase of participants to be analysed as respondents in this study. The researcher analysed the actions of these seven teachers in the dissemination of knowledge through mobile phones in the dissemination programme on TWG activities, and looked at how surface learning deepened their knowledge to their colleagues regarding the knowledge of higher-order thinking skills after the NTP.

3.4 Ethical Procedures

The ethical approval was obtained from Brunel University London, research Ethics Committee, referenced number from 16735-LR-Jun/2019-19290-3; and from the teacher working group at Gugus 08 Ciadeg, Kab, Bogor, Propinsi Jawa Barat, Indonesia (Appendix A). The ethical procedure agreement is a formal written consent that was sought from all participants for both observations, taking photos, records, and interviews. Therefore, a participant information sheet and consent forms were constructed for each participant group and research methods, and approved by the ethics committee.

A consent letter containing the terms and conditions for participating in this project was given to the participants. All participants were required to make use of their mobile phones. The participants were made aware of the mobile connection cost and the limit of what service providers are allowed to participate. They were also advised that they may withdraw at any time without consequences. They were informed that their participation in the study would not affect their level in school. All data will be stored in an encrypted form, and no personally identifiable information such as name or school will be published.

3.5 Validity and Reliability

Many experts have explained the concept of validity and reliability in qualitative research on the social field where the education field is part of them. Maxwell (1996) described the correctness or credibility of the description, conclusion, explanation, and interpretation as validity. Mareceki (2009) further argued that validity is an evaluation of the degree to which the empirical evidence supports or justifies the interpretations and conclusions based on research. Moreover, there are four common tests in social science research, namely construct validity, internal validity, external validity, and reliability (Yin, 2014). However, some experts believe only three tests are common in social science research, namely internal validity, external validity, and reliability while construct validity is part of internal validity (Budiastuti and Bandur, 2018). It can be concluded that validation in a qualitative study is related to the procedure's accuracy to conduct the research; thus, the research results and conclusions can be trusted as a general truth.

Reliability cannot be separated from the validity of the research. Patton (2014) confirmed that reliability is an important factor in design, analysis, and reporting qualitative research. He argued that the validity of research will produce research reliability (Patton 2014). Budiastuti and Bandur (2018) maintained that some qualitative research can be accurate if the study can be duplicated in other research that establishes accuracy and analyses the recording field notes such as logbooks or observation notes. Budiastuti and Bandur (2018) suggested that a qualitative research audit can be carried out on how the researcher analyses the transcript interview, code the data and sub-theme category and research theme and observational variants, and collect the data as part of the reliability of the research. Experts in qualitative research believe that there are several strategies to getting internal validity, external validity, and reliability in qualitative research such as triangulation, feedback, member check, compare with other research, provide a consent form, qualification and experience of the researcher, and understanding the research setting (e.g., Guba and Lincoln, 1994; Lewis, 2009; Maxwell, 1996; Shenton, 2004).

This study is concerned with mobile phones focusing on the learning process as continuing professional development for teachers in HOTS knowledge; the specific measure is participant observations and semi-structured interviews, photo

documents, videos, and captured conversations by mobile phones. Here, the objective of the study is concerned with mobile education by looking at the surface, the deep and implicit structure of knowledge regarding HOTS knowledge, with the original object being an action performed with a mobile phone. The researcher used several validation and reliability research strategies based on expert advice. First, the researcher gave the consent form to be part of the research. Consent forms in a qualitative research are necessary to maintain the research participant's seriousness and honesty (Budiastuti and Bandur, 2018). Also, the researcher's strategies were triangulation, triangulation of the technical data collection (interview, FGDs, observation), and triangulation theory by looking at the conceptual framework and identifying the researcher's sub-themes. Qualifications and experience in research were developed through collaboration in a pilot project with other colleagues that presented at an international conference in London by producing a proceeding paper. The researcher attended other conferences to bring the research framework. Besides, the researcher was trained to analyse data using Nvivo.

Reliability demonstrates that the operations of the study can be repeated. It represents an attempt to minimise errors and biases in the study. Reliability can be improved by using a case study protocol and developing a research database (Yin, 2009). The data from each phase were treated identically. Also, the interviews took place in the same location and were of equal length.

3.6 Data Collection and Analysis

This section deals with the research's data collection and analysis stages. Due to the methodology used in this study, this section is dense and includes several types of data, data collection systems, and data analysis techniques. Therefore, it is divided into several sections. The first section discusses issues related to the data collection process used in this study. The second section describes the process of coding used in this study, followed by the final section which discusses the resources used for this study's data collection and analysis.

3.6.1 Data Collection

Education research often attempts to explain a phenomenon, describe a culture, disclose life experience to predict outcomes or assess variables and impact (Coe et al., 2017). Education research mostly studies the world of teaching and learning to understand, inform, and improve practice. As a result, the researcher determines the method for their study to answer the research question. Moreover, this qualitative research discloses life experience to predict outcomes or assess variables and impact teacher's use of a mobile phone. Ilic (2013) argued that most qualitative research do not begin with full knowledge of research questions before data collection, so data analysis can only identify additional research questions. However, there are several techniques for education research to grab the data, such as in-depth interviews, observation, focus group discussion (FGD), documentaries, and analysis of social media (Coe et al., 2017). In order to address the research question, this study was stretched into several qualitative data collection techniques consisting of semi-structured interviews, FGD, observation form, and digital media records by capturing images and texts. This is not without any reason because the researcher intended to utilise each method (Table 3-3).

Table 3-3 explores the methods used in this research. Each method has the purpose of assisting by answering certain research questions. There are advantages of using the multi-method approach in that the researcher can cross-check the action, perception and statements of participants as part of validating this research. Each method is discussed in depth in the next subsection below.

Table 3-3 The Data Collection Methods and Purpose in this Research

No	Method	The Purpose of the Used Method in This Research
1.	Semi-structured Interviews	A semi-structured interview was used in this study to assist the researcher in obtaining information and perceptions on how and why the participants used their mobile phones during training and activity in the teacher working group.
2.	Focus Group Discussions	This method was used to describe some special topics related to mobile phone activities by discussing them among participants. Therefore, the researcher deliberately tried to reveal each person's views in the group, particularly mobile phone activities, through focus group discussions.
3.	Observation	This method was used to convince the researcher that there are not things 'out there' that were unknown despite all prior methods used, such as the semi-structured interview and FGD. Observations were made in the NTP and DP activities in the TWG to monitor teachers utilising mobile phones.
4.	Digital media recording	This method was utilised to produce a powerful extension of observation and opens up a range of possibilities to capture the habitual action or activities of participants that they share through mobile phones.

3.6.1.1 Semi-structured Interviews

Semi-structured interviews were used to collect data in this research. Some experts argue that interviews are an essential tool of the researcher in the education field and is one of the most important sources of evidence in a case study (Scott and Robin, 1999; Yin, 2014). Two semi-structured individual interviews were conducted over the two phases. The purpose of qualitative research interviews is to see the world from the participant's point of view to collect the meaning of their experiences (Kvale and Brinkmann, 2009). Moreover, interview data collection in case study research is similar to other research interviews (Lune and Berg, 2017). This method helps the researcher obtain information on how and why the participants use mobile phones while in training and activities in the teacher working group. Ilic (2013) supported the view that using

interviews to collect data for analysis helps in this research to gain a better understanding of how mobile phones were used by the participants and their perceptions of their mobile phone usage. A list of questions was prepared before the interview by referring to the theoretical and habitual action that emerged during the training and activities of the teacher working group (Appendix B). The interview was recorded, transcribed, and checked by the participants for accuracy. Unclear descriptions or illustrations from the participants were clarified through retrospective interviews via a WhatsApp call or face-to-face discussions.

The interview questions were of thematic and dynamic dimensions (Kvale and Brinkmann, 2009). The thematic dimension of the question relates to the research topic and analysis of the interview, while the dynamic dimension relates to the positive interaction between the interviewer and interviewee required to keep the conversation going. The use of semi-structured questions allowed for some focus on specific research questions while allowing for unexpected answers from the interviewees. The flow of the questions was maintained by ensuring that the questions were easy to understand. The interviews were around twenty-five minutes long and face-to-face, involving one interviewer and one subject at a time. After each interview was completed, the results were analysed so that any new knowledge could be accumulated and used in the following interviews.

The interviews were conducted three times; the first interview was after 15 participants had finished the NTP, which lasted around 25 to 30 minutes. The second interview occurred after the knowledge exchange in the 08 Ciadag TWG with seven participants. The third action is an interview on the training session that involved only one interview with a total of 20 participants being asked what they do with a mobile phone by directly asking the interviewee to refer to what was observed. Thus, there was a total of 24 interviews with 15 out of 20 participants. The purpose is to clarify between the action and observation (Bogdan and Biklen, 2007), and cross-check against other data collected from a different source for strong evidence of validity and reliability of data (Scott and Robin, 1999). Ilic (2013) supported that using interviews in data analysis can help to better understand how mobile phones were used by the participants and their perceptions of mobile phone usage. Thus, an interview provides rich qualitative data and can help to explore various angles in the research (Bacon-Shone, 2015).

All audio of the interviews were recorded directly on an audio recorder, which had several advantages. The researcher was free to concentrate on the subject's answers and would be less likely to miss the necessity needed for clarification through follow-up questions. All of the features of the subject's responses were saved and could be reviewed later. Recording directly to the audio recorder ensures a high-quality recording that is easily studied and imported into transcription software such as NVIVO, which was used for this study. The use of an audio recorder also increased the reliability and validity of the data. The features of Indonesian culture were also considered when interviewing so that any social and cultural norms are respected. The interview process used the national language (Bahasa) for comfort and easy understanding. However, the purpose of qualitative research interviews is to see the world from the participant's point of view to collect the meaning of their experiences (Ilic, 2013). As a result, the meaning of the participants' statements was of more interest in this study than the linguistic content; therefore, highly detailed linguistic transcription was not necessary. Instead, the interview was transcribed word for word and coded throughout to give an insight into the participants' thoughts related to the research questions.

3.6.1.2 Focus Group Discussions

Focus group discussions (FGD) were used in this study. Bryman (2012) stated that FGDs are used in most qualitative research traditions, where the FGD is an interview with several people on a specific topic or issue (Lune and Berg, 2017). Furthermore, the person who runs the focus group sessions is usually called the moderator or facilitator, and he or she will be expected to guide each session but not to be too intrusive (Bryman, 2012; Yin, 2014). Some experts do not explain the number of members for the focus group discussions but agree that the FGDs should be small (Bryman, 2012; Creswell, 2017; Yin, 2014). Each FGD that the researcher has made has about five to seven people in one session.

FGDs were used in this study to describe some special topics related to this study, and the researcher deliberately tried to reveal the views of each person in the group, particularly about mobile phone activities. In this research, however, the researcher was the moderator to facilitate the group in discussing mobile phones and its aspects,

such as habitual usage of mobile phones as a daily activity and the mobile phone as a source of learning for this training. Thus, there is a short series of discussions sparked by questions asked by the researcher. Limited experience of FGDs, and unfamiliarity with the researcher led to quite a rigid discussion; however, more confidence emerged with a script of questions, as long as the script did not inhibit participation from the informants (Lune and Berg, 2017). Thirty minutes of conversation occurred between the participants. The majority of the analysis on FGDs is to explore information about the habitual action of participants in using a mobile phone in the Cigombong District, which will be explored in the next chapter as the purpose of FGD is to account for particular issues in research to recognise the habitual action of participants (Bogdan and Biklen, 2007).

All audio from the FGD were recorded on the audio recorder directly and subsequently transcribed to get the best result. One reason is to make the discussion natural without disruption during the discussions (Bryman, 2012). Moreover, the moderator needs to keep track of who said what, and the moderator has to have the skills to draw out the feelings and ideas of the group members involved in the FGD. If this element is lost, the dynamics of the focus group session would also be lost, and in the end, a major rationale for doing focus group interviews would be undermined (Lune and Berg, 2017; Bryman, 2012). Like all qualitative researchers, the FGD will be interested in what people say and how they say it. For example, the particular language they used. There is every chance that the nuances of the language will be lost if the researcher has to rely solely on notes (Bryman, 2012).

Additionally, the quality of the audio recorder is extremely important to ensure the conversation is not suffering from a lack of audibility. The researcher must equip himself with a high-quality microphone capable of picking up voices, as a low-quality microphone may be quite faint, especially when sourced from many directions. The researcher borrowed this equipment from his office. The researcher kept all the audio in the Brunel Cloud as part of the agreement with ethics approval and imported into transcription software used in NVIVO. The interview was transcribed word for word and coded throughout to give an insight into the participants' thoughts related to the research questions.

3.6.1.3 Observational Form

Observation is one technique in qualitative research. Flick (2018) argued that observation refers to activities where an observer participates as part of the daily routines of a setting and produces written accounts of ongoing interactions, and is open to underlining anything important, writing inclusive field notes, not imposing exogenous meanings, and so on (Goffman, 2001; Flick, 2018). There are, however, distinctive ways to collect data through observation. The first kind is a structured observation with a watch for particular behaviours, and the second is unstructured observation where the observer participates, records and watches the situation and writes down everything during the situation (Thomas, 2011). In addition, the advantage of observation is to convince the researcher that there are not things “out there” that are unknown despite all prior reading and researching, and there are interactions, processes, performances and routines, riddles and ambiguities that cannot be figured out at the desk (Flick, 2018).

This research connects people, behaviour, and technology (mobile phone). The researcher has assumptions through a prism that enables the breakdown of social activity into quantifiable elements that can be counted through individual action, language, or habit (Thomas, 2011). In addition, this study tries to develop relations with the people in the setting and get as close as possible to their activities and experiences through observation (Flick, 2018). The purpose is not to generate first-hand reports (to see, hear, feel and ‘be there’ personally) but to draw on-field situations and capture slices of social practice referring to particular kinds (Thomas, 2011). Therefore, the selection of this technique in this study aims to gather data on groups and people in their everyday lives when using the mobile phone that refers to the knowledge of HOTS. Furthermore, the observations help find unique announcements, actual actions and behaviour of a participant using the mobile phone at the NTP and DP.

Observation is already supporting this research. This research used a structured observation focusing on utilising mobile phones as the main subject of research. The data was collected through field notes, written in pen and paper observation periods, particularly during in-class activity. The researcher decided what to record referring to

the reflected situation and its influence on the research question, as some details were included and others were not. During the observation, the researcher catches the general movement of the teacher and any episodes of mobile phone use. For instance, teachers discuss in a learning session in the class while their hands use a mobile phone to look for information. This situation stood out during in-class training, and the researcher notes that action in observation form.

The researcher already made eight observations to assist this research; consisting of five observing the activities and habits of participants at the NTP and three at the DP. The majority were observed doing in-service training on the NTP at the Cigombong District and activities on the DP at 08 Ciadeg TWG. In addition, these observations made cross-checking possible between data sources between observation, DMR and interview; this strengthened the existing main themes. It was also used to test the truth of what the participants did with existing digital evidence to draw a more powerful theme, which is also part of the validity and reliability of this study.

3.6.1.4 Digital Media Record

Digital media record (DMR) is part of the data resources of this research. DMR means using digital technology to support research purposes. This research utilises two equipment of DMR; DMR utilising hardware devices such as images and videos, and DMR using digital documents such as portal website, E-book, and participant tasks. The first DMR used hardware devices to record participants' activities during the research. Photographs, videos, and digital documents by the participants were used as data sources in this research. It can be called image-based methods (Thomas, 2011). This method provides a powerful extension of observation and opens up a range of possibilities, including the organisation, interpretation, and validation of qualitative inquiries in case study research in particular (Marshall and Rossman, 2006; Thomas, 2011). Also, there are several benefits to these methods, such as the research was made easier to include the person or persons identified as the research focus. Moreover, the researcher can capture a social scene quicker than taking notes because the captured scene can be paused in time during subsequent researcher analysis (Thomas, 2011). However, the researcher must decide what to focus on while recording and then interpret the data in the recording using photo and video recording

(Marshall and Rossman, 2006). Photographs may also be analysed by examining the framing of the image; who or what is central, and who or what is peripheral (Lune and Berg, 2017).

In the research, videos and photos were used to record the situation during training and notes were taken on what the supervisor and core teacher said during the activity. Furthermore, screenshots were captured during the training using a mobile phone to capture the status or activity of participants about what they shared through mobile phones. For instance, status and pictures shared in the group chat through WhatsApp were recorded. This situation is advantageous as the copy of the data is produced as the event happens, and it enables the research to use raw data in the analysis process. Photo and video recordings are acceptable to many people, but their permission to record must be given, and there may be those who do not wish to be recorded (Lune and Berg, 2017). Various photo and video recording devices are available; the key differences between models are either analogue or digital recording (Thomas, 2011). The advantages of digital recording are that it can be saved as files and transferred to the computer directly. The recording has a numerical index or time attached and the researcher can move the recording within the folder that can be used in the analysis process.

The second is a digital document. Several digital documents were used to support the evidence in using a mobile phone, such as the portal website, E-book (manual book, handbook and policy document) of the NTP, and document on the task of participants. The majority of the documents were released by MoEC RI and participant tasks during the NTP and DP operations. The documents were retrieved directly from the official website of the government (Coe et al., 2017; Matthews and Ross, 2010). In addition, messages among the teachers in WhatsApp were part of the digital document that the researcher used for the primary document. This type of letter writing is changed by technology and nowadays teachers' messages are interactive in character, explicitly forming part of a dialogue, and may be both personal and formal in their style and substance (Coe et al., 2017).

DMR is one of the components of a source of data collection for this research. Two main data sources were used in the DMR to support this research, namely photos and

digital documents, without ignoring other DMR sources. The purpose of DMR is to capture participants' actions and habitual activities in using the mobile phone as part of the main basis to achieve the research objectives. The first is digital photos. There were eighteen photos found to be related to the meaning of this research. This source captured the participants' phone behaviour on the NTP at the Cigombong District and knowledge exchange in the DP in the TWG activity. One volunteer helped with this research, and sometimes the researcher documented it himself through a digital camera on a mobile phone. This method provides a powerful extension of observation and opens up a range of possibilities, including the organisation, interpretation and validation of qualitative inquiries in case study research in particular (Marshall and Rossman, 2006; Thomas, 2011). All of the photos were analysed by making a label of the participants and given the participants' ID; one frame can consist of several participants or one participant in one frame. In addition, cross-checked action was done by comparing and synchronising with another method to check the validity and emerging the themes. For instance, document photos were cross-checked with interview results to generate participant behaviour truths that will support the emerging themes. This process will be found in a later chapter.

The second DMR source is digital documents. The participants directly utilise mobile phones, such as conversations and individual posts on the WhatsApp application, creating this document. This source is part of the primary document. Two actions are separated on this method by capturing individual posts in the WhatsApp group chats and capturing individual participants' status on WhatsApp. The researcher joined in each chat group that the participants created. Thus, the researcher followed the actions of the participants in the WhatsApp group chats when they uploaded their status and commented in the group chat. This document aims to highlight the depth of the participants' conversations and the status that they discussed and shared on the WhatsApp group chats regarding the knowledge of higher-order thinking skills and the programme itself. This information can be an inquiry and analysis of emerging the research themes. Therefore, both sources are an instrument for this study to explore participants' and core teachers' activities through the communication and conversation built between them in the WhatsApp group and get the meaning of what they communicated by making codes and nodes through the Nvivo application.

The DMR notes eight WhatsApp group chats which are built in two activity units. The first activity unit is the NTP in the Cigombong District, which established a single chat group. A total of 842 individual texts were posted in the chat groups including documents, photos, pdfs, and linked YouTube videos and websites. The second activity unit is the DP at 08 Ciadeg, which created seven chat groups. All individual posts in that group accounted for 2,453 texts. Besides the WhatsApp group chats, the DMR notes that there were 34 expressions of participants connected to the NTP activity and knowledge at the Cigombong District and the DP activity at the 08 Ciadag TWG through their personal status on WhatsApp.

All of the documents photos, video recordings, and transcript conversations through WhatsApp were put in the one-drive cloud at Brunel University to ensure the data would not be lost and imported into transcription software such as NVIVO. Thus, the researcher uploaded all the documents and transferred them by putting it in the Brunel University cloud. In order to analyse the data of digital media records, this study used a software for efficiency, namely the Nvivo application, which create nodes through a comparison diagram, hierarchy chart, explore chart, and the visualisation of the result by words. Furthermore, the researcher can cross-check participants' actions by looking at the semi-structured interviews or other methods and draw a thread line in the software from participants' actions towards the themes' conclusion.

This subsection explored the various techniques used to collect data usually used in a qualitative methodology. Four main techniques were used in collecting the data, namely semi-structured interviews, focus group discussion, observations note, and digital media records. This study utilised a combination of techniques to establish a connection between the activities of the participants and mobile phones towards the themes' conclusion. It is also used to test the truth of what the participants did and said with existing digital evidence to draw a more powerful theme, and this is also part of the validity and reliability of this study. Therefore. each technique selected in this study had the purpose of supporting the RQ in this research. Moreover, all the data sources

were put on one drive in cloud at Brunel University to ensure the data would not be lost and some data were imported into a transcription software such as NVIVO.

3.6.2 Qualitative Data Analysis

This study decided to use a case study to explore the phenomenon of mobile phones for teachers in rural areas. This method is unique compared to other qualitative approaches, and the researcher can collect and integrate with quantitative survey data, which facilitates reaching a holistic understanding of the phenomenon being studied (Yin, 2009). Furthermore, Yin (2009) recognised the importance of efficiently organising data. It can be advantageous to accomplish the research task in which raw data are available for independent inspection. Using a database improves the reliability of the case study as it enables the researcher to track and organise data sources, including notes, key documents, tabular materials, narratives, photographs, and audio files that can be stored in a database for easy retrieval at a later date (Wickham and Woods, 2005). Besides, categorising and contextualising strategies help analyse the data collected at different stages (Maxwell, 1996).

There are two common approaches in data analysis in qualitative research, namely thematic analysis and content analysis, but boundaries between the two have not been specified (Vaismoradi et al., 2013). Both have been defined in various ways and applied to a wide range of phenomena, including qualitative study. Those methods have similarities – both involve nodes and coding, that is, a process of representing message content with abbreviated, convenient symbols (Neuendorf, 2018). Also, both analysis approaches are suitable for answering questions such as: what are people's concerns about an event? What reasons do people have for using or not using a service or procedure? (Vaismoradi et al., 2013). However, content analysis is well-suited to analyse the multifaceted, important, and sensitive education phenomena (Vaismoradi et al., 2013). If conducting exploratory work in an area where not much is known, content analysis may be suitable for simply reporting common issues mentioned in data (Vaismoradi et al., 2013). There are two modalities in both approaches, namely inductive and deductive. Inductive content analysis and thematic analysis are used in cases where no previous studies have dealt with the phenomenon, and therefore, the node categories are derived directly from the text

data (Hsieh and Shannon, 2005). A deductive approach is useful if the general aim of thematic analysis and content analysis is to test a previous theory in a different situation or compare categories at different periods.

Thus, this study used a content analysis approach to analyse the data. Some expert argues that content analysis is a general term for several different strategies used to analyse text (Vaismoradi et al., 2013). It is a systematic coding and categorising approach used to explore large amounts of textual information unobtrusively to determine trends and patterns of words used, their frequency, relationships, and the structures and discourses of communication (Mayring, 2000; Pope et al., 2006; Gbrich, 2012). The purpose of content analysis is to describe the characteristics of the document's content by examining who says what, to whom, and with what effect (Vaismoradi et al., 2013).

Data analysis has three main stages. Elo and Kyngäs (2008) defined three steps to process data in content analysis, namely preparation, organising, and reporting. The first is the preparation that both content analysis and thematic analysis are equivalents where the researcher is expected to transcribe the interviews and obtain a sense of the whole situation through reading the transcripts several times (Vaismoradi et al., 2013). However, content analysis suggests that the researcher chooses between manifest (developing categories) and latent contents (developing themes) for several of the data sets before proceeding to the next stage of data analysis (Vaismoradi et al., 2013).

There are various data to be collected in this research which has to be decided by the researcher. Therefore, the researcher made boundaries and categories in reference to the research questions in the early stage of preparation. The purpose is to focus on a research question which is not too broad to be contained in one study. This researcher decided on a single rural area and CPD activity (the NTP and DP at TWGs) as the boundaries. The first boundary is rural, with a category specifically around the Cigombong District and utilisation of mobile technology for teachers in the Cigombong District. The second boundary is CPD activity under the particular circumstances of teacher action on the NTP and DP, which is subdivided into categories of mobile phone activity during the NTP and DP and teacher knowledge (Table 3-4).

Tabel 3-4 Boundary and Categories of the Research Analysis

No	Boundary	Categories
1	Rural area	Cigombong District
		The utilisation of mobile technology at Cigombong District
2	CPD activity (National Training Program framework at Cigombong District and Dissemination Programme at 08 Ciadeg TWG)	Mobile phone activity during the National Training Program and Dissemination Programme
		Teacher knowledge

Preparation was made by the researcher through reading and categorising general data into categories from the research. Therefore, all sources of information that exist and are collected, were entered into existing categories in this step. The researcher tried to immerse the data and obtained a sense of the whole data before the researcher made subcategories, codes, and notes. At the end, the analysis of manifest content or latent content was decided in the next step in organising the data.

The second step is organising the data. The way to organise the data through content analysis is with open nodes. The researcher started to collect codes under potential subcategories/subthemes or categories/themes and compared the emerged coding clusters together and the entire data set comprised the next stage of data analysis (Vaismoradi et al., 2013). This process is known as an organising phase in content analysis. A constant comparative analysis of the data was conducted to find sub-themes that initially emerged from the participants' perceptions of their mobile phone usage and their collaborative activities from any source of data collection. The researcher made subcategories referring to the boundaries and categories. Table 3-5

is the sample to describe how the subcategories supported the categories and boundaries for rural area conditions and how each node and code is created with the support of various data collection.

Tabel 3-5 Sample of Boundary, Cubcategory, Nodes and Codes Made for Rural Area.

No	Boundary	Category	Subcategory	Nodes	Codes
1	Rural area	Cigombong District	Condition of Cigombong District	Location of Cigombong District	Location Cigombong District
					School and teachers' location around Cigombong District
				Infrastructure of Cigombong District	Access to Cigombong District
					Physical infrastructure of Cigombong District
					School infrastructure
					Communication infrastructure in Cigombong District
		Profile of teacher at Cigombong District	The demography of teachers in Cigombong District	The demography of teachers in Cigombong District	
				Avarage age and number of teachers in Cigombong District	
			Profile teacher at Cigombong District	The topography of teachers Cigombong District	
		The utilisation of mobile technology at Cigombong District	Type of familiar mobile device	Mobile device	Mobile technology used by teaches
					Type of Mobile phone
					Number of mobile phones

				Rank capability use mobile phone	Capability of teachers using mobile phone
					The rank of the capability of teachers using mobile phone according to age
			Utilisation mobile phones for routine activities and education learning process	Application use	Common applications used on mobile phone
				Searching activities	Platform or apps mostly used on mobile phone
				Daily activity	Daily activity use through mobile phone
				Source of knowledge for CPD	Sources of information used in seeking knowledge for CPD through mobile phone
				Teaching source and tool	Tool and source of knowledge to help teachers to teach through mobile phone

Table 3-6 Information Analysis of Data from Subcategory and Data Collection Process

Subcategories	Nodes	Codes	Interview Form	Observation	DMR	FGD
Condition of Cigombong District	Location of Cigombong District	Location Cigombong District	V		V	
		School and teachers' location around Cigombong District	V		V	

	Infrastructure of Cigombong District	Access to Cigombong District	V	V	V	
		Physical infrastructure of Cigombong District	V		V	
		School infrastructure	V		V	
		Communication infrastructure in Cigombong District	V		V	
Profile teacher at Cigombong District	The demography of teachers in Cigombong District	The demography of teachers in Cigombong District	V	V	V	
		Average age and number of teachers in Cigombong District			V	
	Profile of teachers at Cigombong District	The topography of teachers Cigombong District	V		V	
Type of familiar mobile device	Mobile device	Mobile technology used by teacher	V		V	
		Type of Mobile phone	V		V	
		Number of mobile phones	V		V	
	Rank capability use mobile phone	Capability of teacher using mobile phone	V			
		The rank of the capability of teachers using mobile phone according to age	V	V		V

Utilisation mobile phones for routine activities and education learning process	Application use	Common applications used on mobile phone	V			V
	Searching activities	Platform or apps mostly uses on mobile phone	V			V
	Daily activity	Daily activity use through mobile phone	V			V
	Source of knowledge for CPD	Sources of information used in seeking knowledge for CPD through mobile phone	V			V
	Teaching source and tool	Tool and source of knowledge to help teachers teach through mobile phone	V			V

Both tables above describe how the notes and codes were made. Researchers organised the data found by collecting them and determining the subcategories based on the nodes and codes. The rest of the process for other boundaries is the same as above.

A final list of sub-theme nodes was placed in matrices by teachers' names and excerpts from semi-structured interviews, observations, DMRs, and FGDs. Afterwards, the teachers' artefacts and retrospective interviews were nodes and put into the matrix by themes and sub-themes, as well as the teachers' names to crosscheck the data. The crosschecked sub-theme data were further analysed for common themes that describe everyday practices and thoughts among the mobile phone members for this study. The sub-themes that emerged across cases included common uses, perceptions, and sub-themes for each of the broader themes of mobile phone activities in the NTP, DP, and other applications. In addition, this study made early boundary codes on the broader content that started from the rural area and CPD activity, continued to categories and sub-categories, and decided the emerging

themes. The process of organising and analysing the identifying themes is discussed in Chapter 5 (Section 5.3 on page 159)

The NVivo software was utilised in this study to help organise the data and analyse the process of data. Many researchers were unsuccessful and went off-track even after taking several research courses because they were unaware of how to handle all of the obtained data (Lune and Berg, 2017), and for this reason, this research used NVivo. This software is considered the best as it offers a variety of tools to handle rich data records and their metadata for browsing and enriching text, visually or categorically coding it, accurately and efficiently annotating, and receiving accessed data records which are developed to handle 'coding' procedures (Al-Kindi and Al-Khanjari, 2021). This type of software is able to help researchers be organised in collecting and analysing data, but it cannot analyse the data for the researchers. Therefore, the researcher also needs to exercise flexibility, creativity, insight, and intuition in the process of analysing the data-saturated research (Bacon-Shone, 2015). NVivo is one of the computer-assisted software analysis package. The research was assisted by this software in enriching text, and visually or categorically coding it because this study highlights the depth of inquiry and analysis using software with efficient processes of teacher learning in the national framework.

NVivo made an efficient process of highlighting the depth of inquiry and analysis through tools provided in this software such as clustering, interrogating data, and visualising results while using various data sources (Budiastuti & Bandur, 2018). For instance, the research is curious about the mobile technology and apps used by teachers in the FGD. NVivo is able to analyse data quickly once the data from the transcript is put in that programme. This software showed that mobile phones and WhatsApp were the most frequently talked about in conversations in the FGD by word cloud frequency (figure 4-4 on page 118). Thus, the researcher immersed himself in the data and obtained a sense of the whole data, and put the notes and codes, including the decision on the analysis of the manifest content or latent content in the next step of the data analysis as part of organising the data. The researcher

determined part of the nodes and codes that can be analysed in support of the available themes. Therefore, the nodes of mobile phones and WhatsApp were the most frequent words in the FGD results which brought forward ideas for the themes *mobile phone and I are friends* and *WhatsApp Contribution in National Framework*.

A node and code is a word or short phrase. It can be symbolically assigned a summative, salient, essence-capturing, and evocative attribute for a portion of language-based or visual data. Nodes can come from the data itself (inductive coding) and particular theoretical or epistemological positions (deductive coding). Moreover, nodes summarising the surface meaning of the data can be identified as semantic nodes, and those that dig deeper into the data and prioritise the analytical framework can be termed latent nodes. This study illustrates how NVivo shows the capability to perform in a qualitative research study and how the software played a strong role in coding and addressing the validity of results.

The last step is a more descriptive phase of data analysis, which was adopted to contextualise mobile phone use in each case to better understand the themes and sub-themes through report writing in Chapters 4 and 5 to explain the conceptual framework of this research and answer the research questions. In Chapter 4, the researcher describes the conditions of the case study by exploring Cigombong District, teacher profiles which include the demography and topography in Cigombong District, and current situation. In addition, Chapter 4 describes the possible utility of mobile phones for teachers in Cigombong District by looking at the members' perceptions concerning the use of mobile phones in aiding their continuous professional development. The investigation does not end with describing the link between area and teacher to mobile phone activity, but also with describing the case implementation by investigating the implementation of the NTP in the Cigombong District and the DP activities in 08 Ciadeg Village. The conceptual framework is examined in Chapter 5 by exploring the themes that emerged. The unique themes that emerged refer to how the researchers organised the data sets. The researcher started by exploring the description of the rural area in Cigombong, consisting of two unique themes named *Aha condition of Cigombong* and *the mobile phone is a friend*. The exploration action of the NTP at Cigombong District and DP activities in 08 Ciadeg Village produced four themes consisting of *all-around mobile phone*; *WhatsApp Contribution in National*

Framework, surface knowledge, and deep knowledge. Furthermore, the research questions are answered in this chapter by giving pros and cons and connecting them to the themes developed by the researchers.

3.7 **Summary**

In summary, this chapter discussed the research design used in the study. This study used a qualitative research, a case study based on the national framework to develop implicit knowledge of teachers through mobile phones in the national framework. Furthermore, participants were selected and described in this chapter by showing their process and criteria. The chapter presented a brief discussion on the selection of research design and gave a schematic that shows different phases of the research.

Chapter 4

Case Study Implementation

4.1 Chapter Outline

The purpose of this chapter is to explore the implementation of the National Training Programme (NTP) in the Cigombong District and knowledge exchange in the 08 Ciadeg teacher working group (08 Ciadeg TWG) in the Ciadeg Village through the Dissemination Programme (DP). Therefore, this chapter describes the data more as the researcher came to the day set for the research work that started in October until December 2019. However, the discussion and analysis will be examined in the next chapter (Chapter 5 on page 155) by presenting the connection between the implementation programme and literature in the education field. The selected case study and participants were at the Cigombong District and 08 Ciadeg TWG. The selected participants were explored in Chapter 3 (Section 3.3 on page 74). The list of participants involved in the research, including their school origins, age, gender, and status are shown in Table 4-1. The researcher indicated to the reader who the participants were, but the researcher would not use it as part of the research analyses because the researcher had collected much data that would be analysed. Therefore, detailed information of the participants was provided for richness of this study but not to be analysed.

Several factors can influence the programme's implementation and success, such as location, infrastructure, teachers' profile at the Cigombong District, and mobile phone utilisation for teachers in the Cigombong District. The data came from the interviews, observation form, and digital media records (DMR), such as capturing conversation on WhatsApp groups and digital photos, as explained in Chapter 3 (Subsection 3.6.1 on page 82). In addition, this chapter starts by roaming the location and infrastructure of the Cigombong District and exploring teachers' backgrounds and the usage of their mobile phones in the Cigombong District. Subsequently, the implementation of NTP in the Cigombong zone was examined to explore the knowledge exchange of several participants through DP activities in the 08 Ciadeg TWG and examined how deep and embedded their knowledge through activities on their mobile phones.

Table 4-1 List of Participants in the National Training Programme in the Cigombong District

No	Initials	Gender	Teacher Working Group	Original School	Ages	Status
1	SSS	Female	Gugus 01 Wates Jaya	SD Srogol 03	51-60	Civil Servant
2	NH	Female	Gugus 01 Wates Jaya	SD Pangarakan 02	36-51	Civil Servant
3	SS	Female	Gugus 02 Srogol	SD Cibandawa	21-35	Contract
4	DH	Female	Gugus 02 Cipelang	SD Cipelang 02	36-51	Civil Servant
5	TW	Female	Gugus 05 Caringin	SD Cikereteg 02	21-35	Civil Servant
6	ID	Female	Gugus 06 Pasir Jaya	SD Cisalada 02	36-51	Civil Servant
7	LH	Female	Gugus 06 Pasir Jaya	SD Cisalada 02	21-35	Contract
8	AR	Male	Gugus 07 Ciburayut	SD Pangarakan 02	36-51	Civil Servant
9	DL	Female	Gugus 07 Ciburayut	SD Panyarang	21-35	Civil Servant
10	MR	Female	Gugus 07 Ciburayut	SD Citiis	36-51	Civil Servant
11	RC	Female	Gugus 07 Ciburayut	SD Citiis	21-35	Contract
12	AK	Female	Gugus 07 Ciburayut	SD Ciburayut 02	36-51	Civil Servant
13	VS	Female	Gugus 07 Ciburayut	SD Panyarang	21-35	Contract
14	SSC	Female	Gugus 08 Ciadeg	SD Ciadeg 04	36-51	Civil Servant
15	EC	Male	Gugus 08 Ciadeg	SD Ciadeg 06	36-51	Contract
16	II	Female	Gugus 08 Ciadeg	SD Ciadeg 02	36-51	Contract
17	NW	Female	Gugus 08 Ciadeg	SD Ciadeg 03	21-35	Contract
18	NK	Female	Gugus 08 Ciadeg	SD Ciadeg 03	36-51	Civil Servant
19	EM	Female	Gugus 08 Ciadeg	SD Ciadeg 05	36-51	Contract
20	SC	Female	Gugus 08 Ciadeg	SD Ciadeg 01	21-35	Contract

4.2 Location and Infrastructure of the Cigombong District

The Cigombong District is one of forty Bogor Regency districts and one of the twenty-five regencies in West Java Province (Bogor, 2015). This regency is part of the Jakarta metropolitan area known locally as Jabodetabek (an abbreviation for Jakarta-Bogor-Depok-Tangerang dan Bekasi), and the Cigombong District is about 80 km from south

of Jakarta (the capital city of Indonesia) or approximately 41 km from the city of Bogor Regency, Cibinong City (Bappedalitbang, 2018). Various access points to the Cigombong District, such as a highway and train tracks, make the journey shorter by at least half an hour from Jakarta to the Cigombong District, either by car or commuter train. In the past, this location was difficult to be accessed from the Cibinong City due to a lack of infrastructure. It is now easier to be accessed as one interviewee said (Appendix B):

NW: *“Nowadays, there is a highway, so it can be faster, which is around half an hour. Before, it takes two hours”.*

Another interviewee said:

AR: *“The distance from regency city is nearly 60 KM. Our village (Ciburayut Village) is part of Cigombong District, which area is surrounded by Salak Mountain. For the road access, we can reach it easily”.*

Both interviewees showed that access to the Cigombong District has been improved recently.

The topography of the Bogor Regency is varied. Bogor Regency mostly encompasses highlands, hills, and mountains on the south side, but mostly low plateau lands on the north side (Bogor, 2015). The Cigombong District, which is south of Bogor Regency, is located on Salak Mountain and Pangrango Mountain surrounded by hills and mountains and bordered by Sukabumi Cianjur Regencies (Bogor, 2015). Figure 4-1 describes a more specific location of the Cigombong District that was provided from Google Maps. The Cigombong District has an area of 40,42 km² (Mansyur and Priatna, 2019).

Figure 4-1 The Topography of the Cigombong District



In addition, there are 81 schools in the Cigombong District, scattered across nine villages (Dapodik, 2020). Several reports have shown that most schools are located on hills and mountains. For example, one interviewee said:

DL: *“...Geographically (Panyarang Primary School) is located in the mountains at the foot of Salak Mountain, precisely in the Ciburayut Village...”*.

Another interviewee, when asked about the location of the school, said:

ID: *“The condition of my school (02 Cisalada Primary School) is at the foot of Salak Mountain, which is still cool. If we say, it is the village, and it is still not clear yes or no”*.

Another example is the Ciadeg Village. This village is one of nine villages in the Cigombong District (Statistics of Bogor Regency, 2020). The Ciadeg Village is not bordered by the sea and located outside the forest area. However, this village is surrounded by hills and mountains (Kemendesa, 2020a). One interviewee said:

II: *“The school (02 Ciadeg Primary School) is located in the countryside, and it is far from the city. The school position is under the foot of Salak Mountain. It is opposite the train tracks”*.

The village that represented the Cigombong District is located in mostly hills and mountain area, and some of the primary schools are located on hills and mountains.

Furthermore, the infrastructure in the Cigombong District is integrated with Bogor Regency, which has been integrated into the capital city. This area is directly bordered by another administrative regency named Sukabumi Regency (Bappedalitbang, 2018). There are several infrastructure plans to be developed by Bogor Regency in the Cigombong District, such as a theme park, resort, hotel, convention hall, golf development, and the settlement area developed by Sukabumi Regency (Bappedalitbang, 2018). Some infrastructures have been built in the Cigombong District such as physical and communication infrastructures. The district has a toll road, railway, school building and dam, housing, and others as physical infrastructures. Nowadays, there is toll road access from Cigombong to Jakarta. The physical educational infrastructures show that the Cigombong District has 81 schools (Dapodik, 2020). The government's official website show 50 primary schools scattered among nine villages with 358 classrooms from 363 learning groups and 36 library classes to facilitate 10,532 pupils (Dapodik, 2020).

However, there is a lack of infrastructure in the Cigombong District. The Cigombong District has uneven road pavements to the village and school. The school's infrastructure also showed that the classrooms are unable to accommodate students, and the condition of the classrooms was not conducive for most schools (Dapodik, 2020). Furthermore, most schools do not have science labs and access to cars and public transportation. As one interviewee said:

VS: "...If I use car, it is around 1 hour from Bogor central district, after that, I use motorcycle and then walk, a car cannot enter the school (02 Selawi Primary School)".

Another interviewee said:

NW: "In the past, this school (03 Ciadeg Primary School) is a part of the remote schools, it probably seems far from the highway and difficult to be accessed by car".

Both of the interviewees clarified that it was difficult to access the school by public transportation and car. Moreover, the interview above reflected the actual conditions and represented the condition of other schools surrounding the Cigombong District.

The second is communication infrastructure in the Cigombong District. This infrastructure is integrated with the national and provincial programme. For instance, the Cigombong District is part of the 'palapa ring' programme (national programme) and 'desa digi' (province programme) through the internet connection facility, cable networking. The topography of the Cigombong District is hills and mountains which leads to an uneven communication infrastructure. In terms of communication infrastructure in the settlement, most interviewees indicated that they do not have cable internet at home, and only a small number of respondents indicated that they have a cable connection at home. Another common view amongst interviewees was that the school does not have a cable internet connection. As one interviewee said:

AR: "There is no internet connection at school, and only several cellular providers have a good connection".

If the school has cable internet, it does not cover all areas of the school. One interviewee expressed that the school has a cable internet connection, but only a few areas get the connection access, such as teachers room, fifth and sixth-grade classes, while other classes have a bad internet connection. Moreover, schools or homes that use cable internet have to pay extra to install it. As one interviewee said:

SSC: "We haven't used cable internet yet. In the past, we try to use cable internet at school, but it is far from internet substation, which is at Kaung Luwuk. After we calculate per meter, the total is three million rupiahs. So we discuss it later with the headteacher".

The interviewees above described that schools try to have internet connection by cable and wireless connection. A minority of schools have cable internet network, and they need to pay extra for the service.

Even though the communication infrastructure has uneven broadband cable access, the broadband wireless access or cellular data network (mobile internet) almost covers the area of Cigombong. For example, one of the cellular operators shows the various signals surrounding the Cigombong District (Figure 4-2).

Figure 4-2 Cellular Company (Telkomsel) Cover Signal Surrounding the Cigombong District

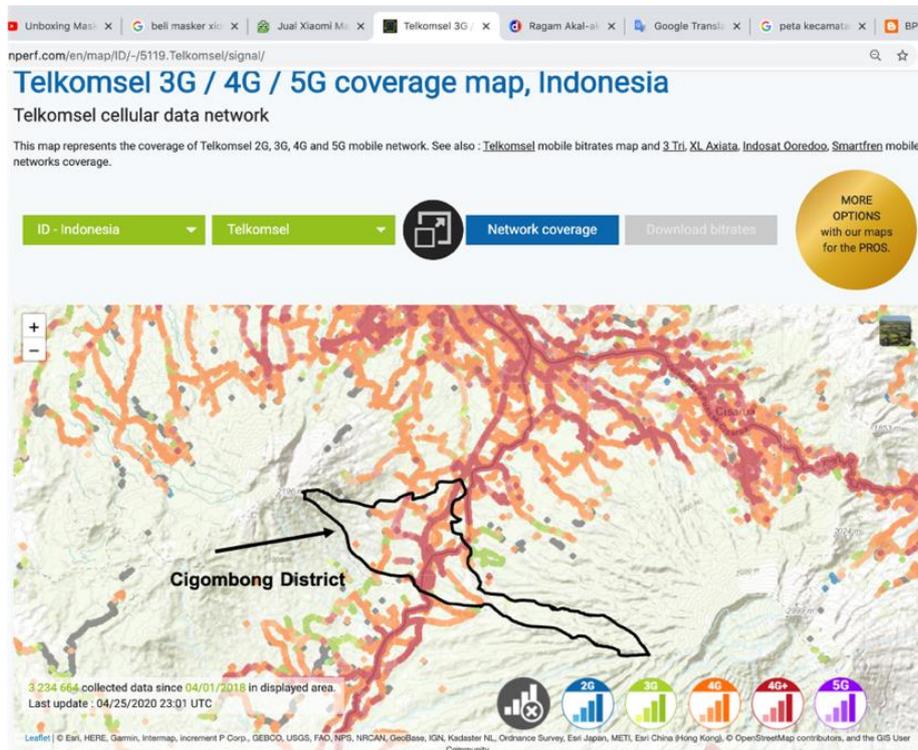


Figure 4-2 shows that most of the service networks are 4G in the Cigombong District. Moreover, there are six Base Transceiver Stations (BTS) in the Cigombong District to help the broadband wireless connection (Kemendesa, 2020b). However, there is variation in the Cigombong District signals such as 4G, 3G, and some areas do not have signals. The figure shows that most mountain and hill locations are unequipped with 4G or have no network. As one interviewee said:

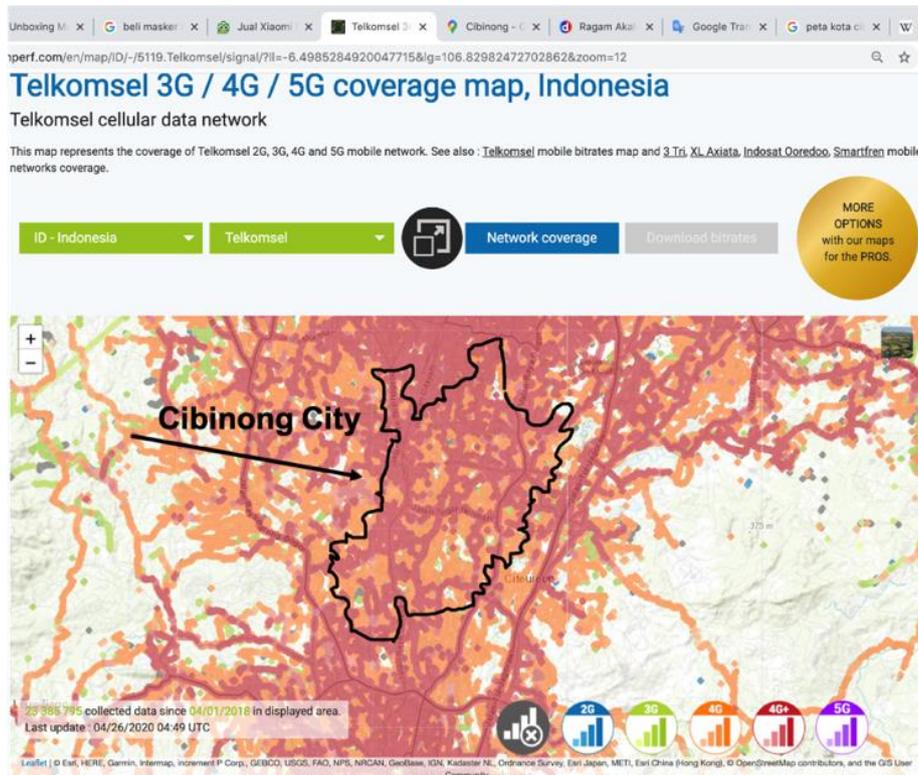
ID: *“Honestly, Signal at home is not good, especially my sim card operator. Sometimes my friend is calling me when I am at school. So, if there’s something urgent, they contact my husband”.*

Another interviewee, being asked about a mobile phone signal at home, said:

AK: *“The mobile phone networks sometimes go up and down, it’s not stable”.*

Overall, these interviews showed mobile phone networks in the Cigombong District, which are sometimes not stable. Moreover, the data shows that half of the primary schools in the Cigombong District use mobile internet by mobile phone as a modem to synchronise the data with local or central authorities (Dapodik, 2020).

Figure 4-3 Cellular company (Telkomsel) cover signal surrounding the Cibinong District



There are quality disparities between, for example, Cibinong City and the Cigombong District in the area of broadband wireless access. Figure 4-3 shows that 4G connections cover the entire area of Cibinong City, and there are no areas without a network. Compared to the Cigombong District, which is mostly hills and mountains, it is not easy to be covered by a cellular data network. It seems that the local authority of the Cigombong District needs to collaborate with the mobile company to cover the unreachable area in the Cigombong District. Furthermore, most interviewees agreed that a mobile phone is an alternative way to connect with the internet at school and home. As one interviewee said:

NK: *“The most often is using the mobile phone because this is the closest technology to us and in our hand. ... On the mobile phone, the data cellular is always open so that we can access google directly”.*

Even though the mobile phone connection is slightly hard to connect, only several sim card providers are good, but most interviewees used mobile phones which are more convenient to access information and knowledge.

In general, the Cigombong District is part of Bogor Regency, a suburban area of Jakarta with various topography. The Cigombong District has nine villages surrounding hills and mountains, and one of them is the Ciadge Village. Some of the settlement areas in the Cigombong District live in the hills and mountains that can be seen from the schools' existence. The infrastructure of the Cigombong District is integrated with Bogor Regency and connected to the capital city systems. Therefore, this district is a new town with two administrative regencies that developed and planned its infrastructure. At present, several infrastructures are present in the Cigombong District. The first is physical infrastructure. This district can be accessed by a toll road and railway, and has public buildings such as schools, hospitals and local government buildings. The second is the communication infrastructure integrated with national and provincial programmes on a broadband cable connection and supported by six Base Transceiver Stations (BTS) to cover broadband wireless connections in the Cigombong District.

However, the Cigombong District has an uneven condition in infrastructure building, access and communication. The lack of infrastructure in the education field is that the classroom's capacity is unequipped to accommodate students, and the condition of the class is not 100 per cent in good condition for most schools. The majority of schools do not have science labs and libraries. Furthermore, the lack of access to infrastructure in the Cigombong District shows that most of the village is hard to access by public transportation and cars. Also, the broadband cable connection and broadband wireless access are a struggling issue in the Cigombong District. The variation of signals stretched between 4G until no signal connection in some areas. Even though there is a lack of infrastructure in physical and communication in the Cigombong District, but at present, the government has recently improved the infrastructure of the Cigombong District rather than in the past.

4.3 Teachers' Profile in the Cigombong District

This section explores the teachers' profile in the Cigombong District. Several factors are explored in this section: the demographic and the topographic situation of teachers in the Cigombong District. Topography explains the teachers' household location, and demography describe the number of teachers in the Cigombong District, the disparities of teachers' population in the Cigombong District including teachers' status, age, education background, and teachers' knowledge of mobile phones. The majority of the data sources are teachers who teach in a primary school in the Cigombong District.

4.3.1 The topography of teachers' residence in the Cigombong District

The locations of the teachers' residence are in the mountains and hills. The Cigombong District has nine villages with 103,690 people spread over 40,42 km², where less than one per cent of the population are teachers (Dapodik, 2020). The interviewees' biography showed that a few teachers live outside the Cigombong District, but most of the teachers live in the Cigombong District. As one interviewee said:

ID: *"... My house is located at the foot of hill, and approximately 1 KM to Salak Mountain".*

Another interviewee said:

AK: *"Probably the geographical condition is almost the same as the school because it is not far from my house".*

This study also researched their method of going to school. The interview result showed that almost 11 out of 15 interviewees said they used a motorcycle or walked to school. For example, one interviewee said:

AR: *"Approximately 8 km from my household, if I ride a motorcycle at a minimum speed. It will take thirty minutes".*

Another interviewee said:

SSC: *"If I use a motorcycle around ten minutes to school from my house".*

Furthermore, the teachers felt that their houses were near to the school. Almost all the interviewees said that they felt their homes were not far from school when they were asked 'how far is your house from school?'; as one interviewee said:

LH: *“My home is near from here (02 Cisadap Primary School); if I’m asked, how far is it from here?. It is probably around 500 meters, and I can walk from my home to school, sir”.*

Another interviewee said:

AK: *“From my home to school is near, around 2,5 KM. Most of the teachers live in the immediate vicinity of the school. The topography of my house is the same condition as my school because the location is not too far”.*

Therefore, the topography of the teachers’ residence is the same as the location of the school, which is mostly hills and highlands surrounding the Cigombong District. The interviewer interpreted that the teachers' houses are not far from the school location, surrounding the mountains and hills of the Cigombong District, and they used a motorcycle or walked to school.

4.3.2 The demography of teachers in the Cigombong District

Teachers in the Cigombong District have suitable education levels. The data shows that most of the Cigombong District teachers have a Bachelor’s degree (Kemendikbud, 2016b). Several teachers have a Diploma degree, and some have a Master degree. The data also indicates that in total, over half of the teachers teach at primary schools. The data reveals that 50 primary schools from 81 schools are in the Cigombong District (Kemendikbud, 2016b). If it is taken by the average, each village has approximately 46 primary schools. For example, the Ciadeg Village has six public primary schools. The names of the schools follow the number order, for example, Ciadeg Primary School 01 to Ciadeg 06 Primary School, where the schools are in one community teacher group, named the 08 Ciadeg TWG. Thus, primary school teachers are evenly distributed in every village in the Cigombong District. Another teachers’ profile shows that the teachers are between 20 to 60 years old, and approximately 60 per cent of the teachers are female in the Cigombong District (Dapodik, 2020; Kemendikbud, 2016b). The data shows that most teachers are between 20 and 39

years old (Kemendikbud, 2016b). The participants' biography shows that almost 13 out of 20 participants have 11 years of teaching experience. A minority of the participants indicated that they have less than five years of teaching experience. It can be assumed that half of the teachers in the Cigombong District have adequate teaching experience. Although the teachers have appropriate education levels and experience to teach, only less than half of the teachers have a professional certificate from the government (Kemendikbud, 2016b).

There are two types of teacher status in the Cigombong District. The first type is the government servant status. This type is considered a good status because the teacher receives the primary salary from the central government. There are several requirements and qualifications to be a government servant, such as linear education background, teaching experience, and passing central government tests. The second type is a contract teacher status whose primary salary comes from another source: the school, a local authority (district, province), and society. The qualifications for a contract teacher are simpler than the government servants. However, there is no different treatment for both of them to improve knowledge, pedagogical skills, professional approach, and continuing professional development in the Cigombong District. For example, 60 per cent of the teachers who participate in the NTP in the Cigombong Zone are government teachers, and 40 per cent are contract teachers. Moreover, the local authority speaker in the national training programme in the Cigombong District said that participants are chosen by the local authority based on the performance as the best teacher in the teacher working group where the school does not have the right to select the participants for this programme. This position can assume that there is no different treatment for both of them, as long as they have good performance in TWG.

The majority of teachers in the Cigombong District are contract teachers. Nowadays, there are 722 teachers, or approximately less than one per cent of the population at the Cigombong District are teachers, spread among nine villages (PDSPK Kemendikbud, 2020). The new data shows that approximately two-thirds of teachers have contract status, and the majority of contract teachers are paid by the school rather than by the local authority (district or province) (Kemendikbud, 2016b). Another

phenomenon shows that most contract teachers said their homes are around the school. For example, as one interviewee said:

NW: *"It's near, my house, it is around a hundred meters from here (03 Ciadeg Primary School)".*

Another interviewee said:

RC: *"It's near, approximately fifteen minutes if I ride a motorcycle to school (Citiis Primary School)".*

However, their reason for choosing to live close to the school was not asked because it is not part of the research focus. In contrast, most government servant teachers live a little bit farther from school, but they live in the surrounding Cigombong District. As one interviewee said:

MR: *"My home is around the Pasir Muncang area. From Pasir Muncang to Citiis primary school is roughly 7 KM. Every day I use a motorcycle or public transportation than taking a walk to school".*

It appears that there is a phenomenon in school to recruit teachers who live in the school's surrounding area. It is possible because the school has the authority to find new teachers following the regulations from MoEC RI for contract teachers based on the budget set by the school.

Teachers in the Cigombong District have competent skills in technology. There is a keen question referring to this skill: the teachers' ability to operate a mobile phone. A rating scale of 1 to 5 was used, as referred to by Howlett and Waemusa (2018) who studied teachers' ability rating to use technology from novice to expert (the Dreyfus model of skill acquisition). The interview result shows that almost nine out of 15 interviewees said they are competent in operating a mobile phone. For example, one interviewee said:

AK: *"...For me, I'm in scale 3 because I'm not expert to use a mobile phone, only downloading and uploading. I can use google drive on my mobile phone and edit photos like cropping".*

However, most respondents who are proficient in using a mobile phone are respondents between 32 and 41 years old (33%). As one interviewee said:

LH: *"I am still learning how to upload my learning video. My result of the learning process in the class is using YouTube channel on the mobile phone. If I scale myself, I want to be scaled five because I can't edit properly. To be honest, I need to learn more. I often ask for help from the school operator to edit my video".*

These results exposed that teachers in the Cigombong District were self-rated as competent to operate a mobile phone. Some of the teachers were self-rated as competent.

To recap, the teacher profile in the Cigombong District was explored by looking at the topography of the teachers' residence and demographic profile of teachers in the Cigombong District. First is the topography of the teachers' residence, which found that most teachers live near the mountains and hills, and near their school locations. Teachers have an accessible route to the school by motorcycle or walk to school. Second is the demographics of the teacher. Teachers who teach in the Cigombong District have appropriate education levels and experience to teach, with the majority aged between 20 to 40 years old. Furthermore, there are two types of teacher status, namely government contract teachers and contract teachers. Most teachers in the Cigombong District are contract teachers, and they reside near the Cigombong District. This shows a connection between the location of a teacher's house with their status. Regardless of their status, all teachers are encouraged to improve their knowledge, pedagogical skills, professional approach, and continuing professional development in the Cigombong District. The findings showed that less than half of the teachers have a professional certificate in the Cigombong District. Another demographic information that was asked was the teachers' technology skill, particularly on the mobile phone. Most teachers have competent skills to operate a mobile phone, as referred by their self-assessment.

4.4 The Utilisation of a Mobile Phone for Teachers in Cigombong

This section aims to discuss the utilisation of a mobile phone to support the activities of the teachers in the Cigombong District, particularly teachers who teach in primary school. A variety of data sources was used to talk about mobile phones in the daily routine habits. The primary source of data in this topic is an interview with focused group discussion (FGD) with six members of the FGD teacher group. The questions in this section focused on the teachers' specific activities in using a mobile phone (Appendix C). Another source was a personal semi-structured interview, and 15 interviewees were asked about their daily routines on a mobile phone. The results provided some worthwhile insights into the teachers' mobile phone daily routines in the Cigombong District.

A mobile phone is a comfortable technology for teachers in the Cigombong District. There are several devices that the teachers use in their daily routine, such as laptops, mobile phones, and tablets. According to the interview data, most of the Cigombong District participants have a mobile phone rather than a laptop. However, not every teacher has a tablet device. The interviewees' popular attitude in the focused discussion group said that the teachers felt more comfortable using a mobile phone than a laptop to search for information. As one interviewee expressed:

NK: *“Most of the time, I use a mobile phone because of its closeness with me than laptop and always in my hand. It is always opened when I compare it to a laptop while there is still time to open and prepare. The mobile phone is always ready to be used, and I can directly go to Google website to search for information, so I feel homey to use mobile phones”.*

Moreover, some interviewees compared a mobile phone and a laptop, where they felt that a mobile phone is easier to use in challenging conditions, such as in class. As one interviewee said:

AR: *“...The laptop has a limited condition because it is uncomfortable to bring everywhere. Sometimes there are questions from the pupils, but we don't know the answer or doubt that. So we can open the internet directly on a mobile phone”.*

Almost three out of six interviewees in the FGD said their mobile phones always have packet data to connect to mobile internet. As one interviewee said:

NK: *"I always have data packet in my mobile phone, unless we cannot do anything, I am as dead as a dodo".*

Overall, these conversations indicate that teachers who teach in a primary school in the Cigombong District are more comfortable on a mobile phone compared to other devices.

The teachers conducted various activities using a mobile phone. Teachers pointed out that the interviewees focused on two aspects of mobile phone use: supporting day-to-day activities and learning support. Almost 11 out of 15 interviewees said they use mobile phones for both activities. The first topic is supporting daily routine habits through a mobile phone. Several questions were identified by this topic, such as the mobile phone's main function besides communication and most of the apps they use to support daily routine activities. According to the FGD, almost six interviewees said they use mobile phones to look for information such as news and general information that they need in life. Other activities through mobile phones are entertainment, playing games and business (product selling, online shopping). Five out of 15 interviewees said they are regularly active in selling products and online shopping, where they deal with transactions through mobile phones. For example, one of the interviewees said:

NW: *"For me, I have an online business as a side job to get extra money. Therefore, I use a mobile phone to help me sell the product".*

A supported interviewee said:

VS: *"Yes, a mobile phone for me is to improve my knowledge and sometimes selling product but it not focus yet".*

Both interviewees represent other teachers who have an extra side job by selling products and making business transactions using mobile phones to get extra money. Moreover, more than ten out of 15 interviewees said they were getting advantages from a mobile phone connected to daily routine activities. As one interviewee said:

NW: *"I usually use mobile phone because practise and easy to access".*

Another Interviewee said:

RC: *“Mobile phone is simple, practise and faster”.*

However, mobile phones for teachers in the Cigombong District are not without challenges in their daily use. According to the FGD forum, four out of six FGD members believed that the signal is the main barrier to mobile Internet access. These statements are in line with previous data from a cellular company, which is that broadband wireless connection in the Cigombong District has a variety of signals, and some of the areas have a blank connection in the Cigombong District. An in-depth analysis of the hurdle to access the internet will be exposed in the next chapter.

Figure 4-4 Word Frequency Results from the FGD



Nowadays, WhatsApp is a popular application for teachers in the Cigombong District. The researcher asked for more in-depth information on the applications commonly used by teachers in their daily activities. The majority of interviewees revealed using

WhatsApp to communicate and share information or knowledge with family members or colleagues. As one interviewee said:

SSC: *“WhatsApp can send a message directly, read it faster and straight forward to be read on the group”.*

Moreover, the FGD word frequency analysis shows that WhatsApp is the most frequent word in the discussion (Figure 4-4). Also, the forum revealed that the teachers frequently used social media applications such as Facebook and Instagram. The teachers used Google to search for information and knowledge base.

The second topic is mobile phone as learning support. The interview found two types of learning support through mobile phones that the teachers used. The first type is to support the learning process in class, and the second is learning support for continuous teachers professional development. Almost 11 in 15 interviewees think that mobile phones help teachers in class. For example, one interviewee said:

AR: *“...For example, when the pupils ask the question but there is no supporting materials and sometimes I do not understand the content so I search the materials in google website through a mobile phone”.*

Another interviewee from the FGD said:

NK: *“When the process of learning is going on in the classroom. I have a problem with the content and have a hard time finding a sourcebook. The way to solve it fast and easily is via Google in mobile phones”.*

Both of the interviewees clarified that teachers use mobile phones to support students learning in the class. Most FGD members said that teachers use the mobile phone to support searching and sharing activities on the content of the subject matter in class. Four out of six FGD members used Google and YouTube as the tool for searching knowledge to support the learning process. Overall, these results indicate that the teachers made full use of a mobile phone to support learning in class. However, the teachers use mobile phones for the learning process in the class and for themselves to improve continuous teachers' professional development. The majority of teachers search for information about professional teacher and teacher knowledge. Moreover, teachers share information through mobile phones when they do not have the

opportunity to meet and chat directly (face to face). The exploration of mobile phones to support continuing teachers' professional development is further discussed in the next subsection (Subsection 4.5.2 on page 125 and Subsection 4.6.3 on page 147) and in an in-depth analysis in Chapter 5 (Subsection 5.3.3 on page 174).

To summarise this section, the teachers from the Cigombong District felt more comfortable using a mobile phone than other devices. Teachers use mobile phones for two main activities, namely daily routine activities and learning support. The majority of teachers were described to use mobile phones for both activities. The first use of a mobile phone is for daily routines. The teachers used mobile phones not only for communication but also to search for news, information, entertainment, playing games and business. They used Google and YouTube to search for information, and support their daily activities. Besides, WhatsApp is a popular application to communicate and share information with all members around the teachers. Thus, WhatsApp, Google and YouTube are the most favoured applications and most commonly used for daily routine activities in the Cigombong District. The second use for a mobile phone is to support the learning process. These activities are divided into mobile phones that support learning processes and support continuous teachers' professional development. The purpose of mobile phones in supporting the learning process in class is to help teachers find information connected to certain context or learning content. Conversely, mobile phones support continuous teacher professional development by searching for information on professional and pedagogy knowledge.

4.5 The National Training Programme in the Cigombong District

This section investigates the implementation of the national framework programme known as Zoning based Learning Competence Improvement Programme or National Training Programme (NTP) in the Cigombong District. The investigation looked further at the concept and implementation of the NTP. The comparison between the government policy document that was explored in Chapter 2 (Subsection 2.4.3 on page 40) with the actual implementation of NTP in the Cigombong District in some elements, such as activities where participants used a mobile device during the training programme, the implementation of the LMS during the training session, and the result of a training programme in the Cigombong District. The data was explored through inductive content analysis with several data sets, such as interview, observation, DMR including video, audio record, and photo, as well as capturing chats on WhatsApp to support this study.

4.5.1 Comparisons of the guidance book with the actual implementation of the NTP in the Cigombong District

The NTP in the Cigombong District works according to a guide book. These views were in respect to the observation for the NTP in the Cigombong District. The real situation was observed by capturing and taking notes, and the observation was compared to the policy document to describe the actual implementation in the Cigombong District. Several elements referring to the policy document and technology implementation were explored, including the selection process of candidates in the NTP, time of activity of the NTP, the teaching and learning process of training in the Cigombong District, the organising of the local government to implement the NTP in the Cigombong District, and the discrepancy that occurred in implementing the programme. It was concluded that the local government moderately follows the rules planned out in the guide book.

The first factor is the selection process of candidates in the NTP in the Cigombong District. Several participants were selected for this programme in the Cigombong District. The guideline book states that each zone has a minimum of ten participants with a maximum of twenty teachers (Lisdiana et al., 2018). The list of attendants showed that twenty participants joined the NTP in the Cigombong District. The core teacher LMS indicated that there were twenty participants in the Cigombong District.

The participants emerged from seven teacher working groups surrounding the Cigombong District, with most participants coming from the 08 Ciadeg teacher working group. Besides, the biography data showed that more than half of the participants are government servants. It is assumed that the local government advanced the government servant teachers rather than contract teachers, even though most teachers in the Cigombong District are contracted teachers. However, the policy document did not explain how many teacher working groups can join in one zone and the teacher status of those selected for this programme. Khaer (2019) described that the participants are the best teachers, and in the teacher working group at a zoning area, by which they must be part of the community teacher working group.

One speaker at this programme from the local education institution described the following: *"...Who proposed the teacher as participants were from the local education officer in accordance with the school zoning. The selected teachers are the best teacher and are in the teacher working group on one zoning. The story was, that you are the best teachers in your zones"*.

Participants in the Cigombong Zone are probably the best teachers and the most active in any teacher working group activity. The LMS reported that over two-thirds of the participants passed in this programme in the Cigombong District. Presumably, there is no connection with the teacher's status in this programme as long as teachers achieve the above criteria.

The second is the time of activity of the training programme. The schedule of this programme follows the instruction from the local government. The implementation followed precisely from the guidebook where it was implemented in five weeks. Moreover, it was observed that the in-service training activities were held every Saturday and started on 5th October until 2nd November 2019. Meanwhile, the digital document reveals that activities on the job training were performed during the learning process between week two and five in-service training.

The data report shows that most activities took place in 02 Ciadeg Primary School, and the school superintendent chose several schools as activities on on-the-job training for the teaching practice. The digital documents show that the participants were monitored by the school superintendent during the on-the-job training in every

session. However, the guidebook analysis reveals no detailed explanation about the location's specifics for doing the activities. Nevertheless, the guidebook only describes several standard requirements for infrastructure and facilities to conduct this program described in Chapter 2 (Subsection 2.4.3 on page 40).

The third is the teaching and learning process of the NTP in the Cigombong District. There are several points and activities in this process, such as doing tasks, strategies of implementing training, assessment of participants and the LMS (Lisdiana et al., 2018; Bestary et al., 2019). For instance, participants conducted several tasks such as developing the learning design, teaching plan, assessment and implementation of HOTS in the classroom with two learning units (Lisdiana et al., 2018). Moreover, the implementation used mixed strategies, namely in-service training (IN) and on the job training (ON), and at the end of the program, there is an assessment test at the end of the program (Bestary et al., 2019). The LMS shows that the actual implementation in the Cigombong District is complete, where the participants participated in the program almost 100 per cent.

The observation of teaching and learning is clear that teachers are doing their job precisely with applying two learning units to be competent in this program, namely shapes and sequences of fractions (mathematics subject) and forms of energy and changes (natural science subject). The data report shows that participants completed ten tasks (skills score) with an average score of over 85 (Appendix E). In general, it was concluded that the teaching and learning process was properly implemented and completed.

The fourth is that the programme was organised well and ran smoothly. There are several requirements for the implementation of this programme, such as infrastructure and facilities. For example, a class requirement is a 40 people capacity and must provide electric power, including internet connection (Lisdiana et al., 2019). The digital document reveals that all infrastructure and facilities are well prepared during the session, such as a class for 40 teachers including electrical power, the screen projector and sound system, and others. Moreover, the digital document shows that teachers bring their laptop to work on in-service training activities. Nevertheless, there is a mismatched service during the programme. For example, the observation form

revealed that there was no fixed cable connection in the class, which led to the participants having difficulty accessing the LMS programme and the programme's content. Besides that, sometimes electric power was off. As a result, teachers used two devices (laptop and mobile phone) to help them learn and work on this programme at the same time. Thus, it was seen that the local government had generally organised the programme smoothly.

However, there is a discrepancy in implementing the NTP in the Cigombong District. The discrepancy occurred between the government document and the real implementation regarding the local government that hosted this event in the Cigombong District. The discrepancy condition was observed during the training sessions, but this non-conformity had been mutually agreed upon by the participants, the core teacher, and the local authority. The observation shows that there is a discrepancy in several sections. One of the crucial observation that showed a discrepancy in the selected unit analysis was in activity IN-2. The government documents said that selecting the learning units should be referred to the national exam from each school (Zalilia et al., 2019); therefore, this condition can bring each participant to different learning units.

In contrast with the implementation, the core teachers chose the learning unit by analysing and discussing the programme with all core teachers in Bogor Regency before the training. They decided on a learning unit in the Cigombong District with two learning units named shapes and sequences of fractions (mathematics subject) and forms of energy and changes (natural science subject). The core teachers explained this process in front of the class and most participants seemed to understand and agree with this decision and used these learning units to improve CPD themselves. However, the core teachers conveyed the analysis process and determined the learning unit on IN-2 activities. Besides, there is a rearrangement in the time and place during the programme based on the observation. For example, the time break of sessions was seen by the responses of the participants. In general, the discrepancy was seen to be tolerated, and the participants agreed with it.

To summarise, a comparison was made between the guidebook and actual execution in the Cigombong District. The comparison looked at some elements consisting of the

number of participants, time of implementation, learning process, and organisation event. The first is the number of participants in the Cigombong District, which was 20 teachers from seven teacher working groups surrounding the Cigombong District. The second is the schedule of the event. The local government training was held from 5th October until 2nd November 2019 and needed five weeks to finish. The third is a learning process that participants followed with three strategies: in-service training, on-the-job training, and LMS for mentoring, and participants succeeded in finishing all tasks and assessment. The fourth is the organisation of the event that the local government provided facilities and infrastructure were satisfactory. Even though there are discrepancies in implementing the NTP in the Cigombong District, the process is within tolerance and agreed with the participants. Thus, the implementation in the Cigombong District moderately followed the rules planned out in the book guide.

4.5.2 Mobile Phone Activities During the Training Programme

This topic focuses on the interaction with mobile phones during the NTP in the Cigombong Zone. The DMR showed that all training participants have a mobile phone in their hand, and all FGD members said that they always have a packet data connection to connect to the internet and credit to communicate. The observation and DMR findings indicated that mobile phones are always seen almost all the time during training. It seems that core teachers were permitting participants to bring a mobile phone during the session. Therefore, the study investigated further mobile phone use during the training programme, focusing on the programme's content and material of the programme itself. Two key points were identified in this subheading regarding mobile phone use. The first is the physical action of using a mobile phone during in-service activity training, on the job training, and the second is to exchange knowledge and transaction between participants through the mobile phone.

The first is the physical actions of mobile phone use in learning, both in the class and out of the class. It was observed that participants actively used their mobile phones in the class, including texting, calling, and taking photos. The data showed that 12 out of 15 interviewees said they were using their mobile phones to take photos and record videos (IN and ON activities) to support the learning process (Figure 4-5). The DMR

captured five participants who were actively taking photos and recording the document via a mobile phone.

Figure 4-5 Participants Actively Utilise the Mobile Phone to Support the Learning Process in the Class



The mobile phone was used not only to take photos and record videos, but also as a modem connection. Around half of the interviewees used their mobile phones to connect the internet to their laptop. The DMR notes that several participants used mobile phones for a modem to connect internet on laptops, and the observation took note of the same action in activities in each 'In-service training' meeting. Moreover, the

digital documents showed that some participants used their phone to read the task while they were working on the laptop at the same time. The participants used two devices in one action. The observation took note of the same action during activities class In-service 2, 3 and 4 (Figure 4-5).

The second is in the exchange of knowledge between participants through the mobile phone. This activity mostly happened out of the class. The participants shared their discussion and asked questions by calling or texting with their mobile phones when they were not in class. The participants used WhatsApp to communicate with other members as the DMR showed that all the participants have the WhatsApp application on their mobile phone. The participants were grouped in one big group chat on this programme, the 'PSRTA PKP Ciadeg Cigombong'. Therefore, the transaction could be seen in the WhatsApp group's activity with over 842 individual posts including 75 non-text (Media, Doc and Link) individual posts by the participants and core teachers. Almost all the participants were involved in texting and sending a message on WhatsApp. The conversation topics discussed the programme, content, and daily activities of the participants, such as family issues, jokes, and product sales. According to the analysis of the individual posts in the chat group record, there was less analysis of the individual posts in the chat group, and less than 20 per cent of out of context discussion in this chat group. These activities show that the participants were familiar with WhatsApp as a communication tool to text and call. In addition, activity sharing was not only among their classmates, but also among their colleagues. Five out of 15 interviewees said that they shared the content of knowledge through mobile phone, and more comprehensive analysis can be found on Chapter 5 on Subsections 5.3.3 (on page 174) and 5.3.4 (on page 186).

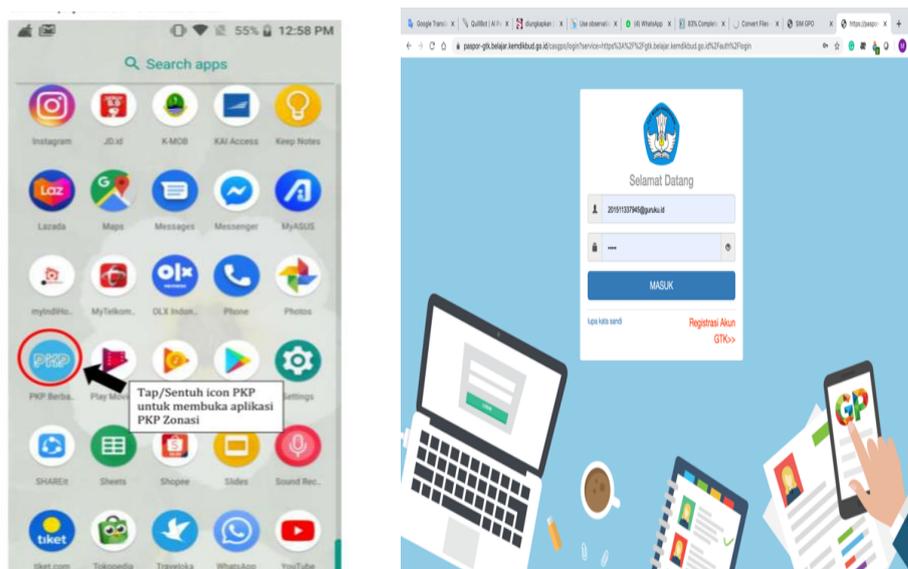
In general, it appears that participants were using their mobile phones actively during the training program. Core teachers did not restrict the participants from using mobile phones because mobile phones were used to support the learning process. Moreover, there were two main activities of mobile phone use in this training programme. The first is physical actions that participants use to take photos, record the material, use the phones as a modem to connect to the internet, and read the module. The second is in exchanging participants' knowledge and transaction through the mobile phone besides being used to communicate with other participants outside the class and share

the knowledge with other colleagues in school. Chapter 5 provides more specific details of the analysis .

4.5.3 The National Training Programme in implementing LMS

The NTP implemented LMS to assist in the learning process online, as described in Chapter 2 (Section 2.4.3 on page 40). The implementation showed that participants used the LMS. It was observed that participants used LMS to report their tasks and for administration reports during the programme. It was seen that the participants used the mobile version slightly more to open LMS rather than the web version. Zalilia et al. (2019) described that there were two versions to access the LMS. The first version is a web version, and the second is the android application version; both can be accessed by computer and mobile phone (Figure 4-6).

Figure 4-6 Two Types of Access to the LMS of the NTP



Type 1: Mobile Version

Type 2: Web Version

The core teacher grabbed the LMS programme's material and content for the learning process (in-service training and on the job training), such as materials for presentation, learning videos, and others. For example, it was recorded that the core teacher was playing the learning video (title: ecosystems), which was found from the LMS. There were two ways to get these contents: using the learning management system that was accessed through <https://pasporgtk.belajar.kemdikbud.go.id/>, or open source access through the official website, belajar.kemdikbud.go.id (Figures 4-7 and 4-8).

Figure 4-7 The NTP Learning Management System

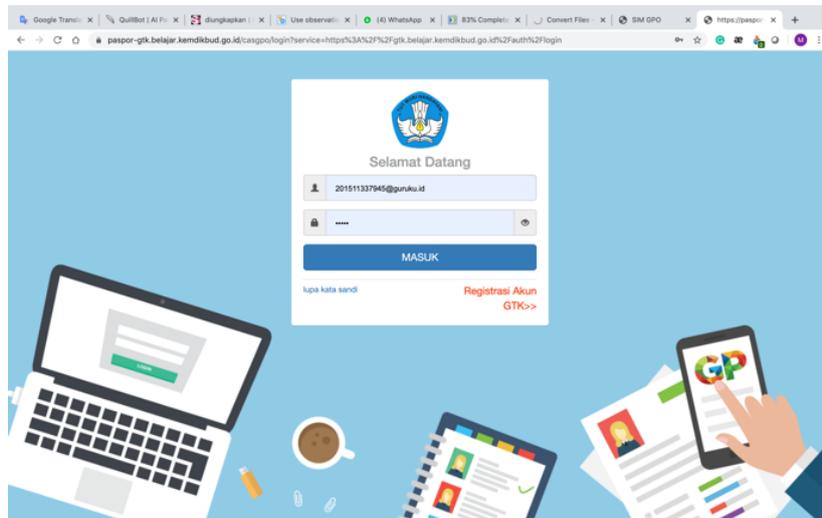
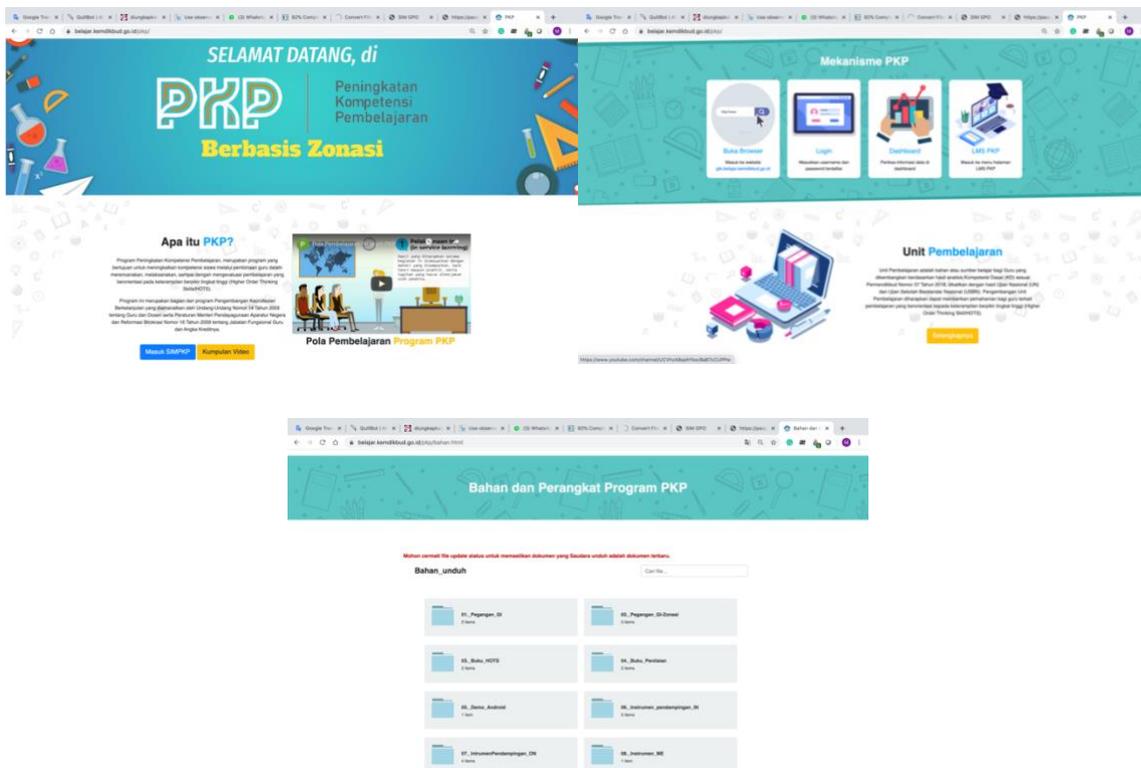


Figure 4-8 Official Government Website that is the Source of Knowledge and Content of the NTP

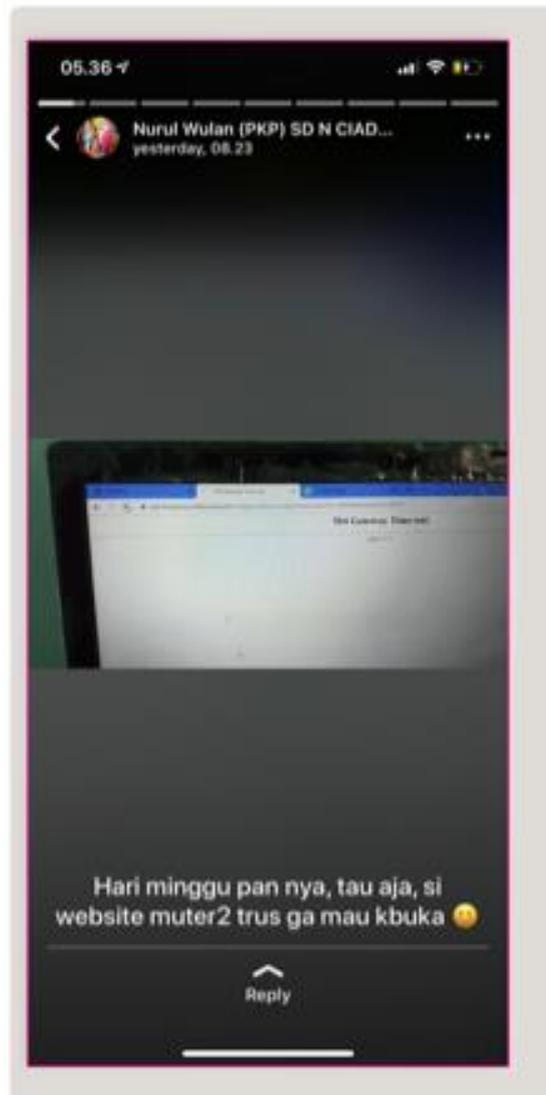


The difference is that the LMS can only be accessed by participants who registered through the local government to join this programme, and there is a learning process structure that refers to the system (Bestary et al., 2019). Meanwhile, the official website provides the knowledge and content of the NTP without the learning process structure. The content of both sources were analysed, and it was found that they were similar with the main source integrated into each other. It probably seems that MoEC RI are giving an alternative system for teachers to access material in several ways for easy access.

It was seen that the participants frequently accessed the LMS. The interview data showed that most participants frequently accessed the LMS during the training session, but unfortunately the study did not obtain access to look at the participant's log data in the Cigombong District from the MoEC RI regarding the participants' frequency in accessing LMS. Eight of the 15 interviewees 'who regularly access the LMS' said that the mobile phones helped them to access the LMS. The majority of them read and send tasks to the LMS through their mobile phone. However, the participants faced a challenge in using the LMS in the NTP. The challenge was clearly disclosed by the participants during the training session and revealed by the core teachers. Two issues were identified in the LMS. The first issue was with the MoEC RI application. It was noted that the application was hard to log in, upload, and download, and several times the server was down or unable to be accessed. The second issue is the action and activity in the LMS. This issue was identified from the observation form, DMR and interviews.

The first issue was majorly from the system of the central government. The DMR recorded that the server was down or could not be accessed several times. This problem could not be fixed by the participants and core teachers in the Cigombong District. Another factor was the uneven broadband cable and wireless connection in the Cigombong District that made participants struggle to access the LMS. Even this case was unclear about where it came from but the DMR captured that over five out of 20 participants openly talked about the problems to use the LMS through their WhatsApp status. Figure 4-9 shows a profile picture status that one of the participants had published.

Figure 4-9 Wall Status on WhatsApp



(NW: *“During the weekend, the LMS cannot be accessed”*)

This expression did not happen during the face-to-face meeting, although some participants had expressed this in or out of the class. As one core teacher mentioned in the class and one conversation captured on the WhatsApp group chat:

RGI: *“...I have the same problem to sign in in my account, we must try it again and again. It needs the patience to do this”.*

Table 4-2 WhatsApp Conversation at Chat Group 'PKP KKG 08&02'

Date & Time	ID	Conversations
[31/10/19 09.38.26]	DL:	<i><attached: 00001042-PHOTO-2019-10-31-09-38-26.jpg> LMS, since this morning it is hard to access. when it opens, I cannot upload my task. Is there any same problem with me?</i>
[31/10/19 09.49.50]	AR:	<i>How about all task in LMS sent to core teacher?. Instead of participants always complain about LMS which is always error. it's not our fault.</i>
[31/10/19 09.51.16]	SGI:	<i>Send in group chat, while waiting the LMS running again.</i>
[31/10/19 09.51.51]	SGI:	<i>Core teacher LMS is still not functioning until now.</i>
[31/10/19 09.52.52]	AR :	<i>Is your means is personal message?, maybe, because it's put in group...</i>
[31/10/19 09.54.17]	SGI:	<i>It's ok in this group too.</i>

Thus, the LMS problems did not happen only among participants, but also to the core teacher. Furthermore, Table 4-2 describes that there is a problem to sign in and upload the task. The participants openly showed the problem in their status and classroom and expressed it in the WhatsApp group chat.

The second issue is the action and activity of the participants on the LMS. It was seen that the challenge in the LMS utilisation for the participants was to connect and access the LMS. Nonetheless, at the end of the programme, the LMS notified that the participants were done with their completed tasks, assessment, and checklist of attendance on the LMS. However, another fact showed there were no participant activities using video call and forum chat through LMS in the Cigombong District. It can be seen from the core teachers' access after the researcher obtained permission to access a core teacher's information on the activity of participants on the LMS. Even though there it was not mandatory to use the video call and forum chat application, the central government provided facilities for participants online mentoring with core teachers with synchronous communication, asking, and sharing with other participants through the synchronous system (Zalilia et al., 2019). This evidence was supported by the core teacher, who said:

SGI: "LMS, as long as I monitored, is never used. Maybe they [teachers] do not have enough understanding yet about LMS. Ninety per cent of participants' discussion was through mobile phones with WhatsApp. Moreover, most participants contacted me through personal WhatsApp or in group chats".

The digital documents showed that the core teacher delivered the content over ten times through the WhatsApp group chat regularly, and some participants received the content from the core teacher's flash disk. The researcher constantly noticed that some participants were taking photos of the slide presentation through their mobile phone. As one interviewee said:

AR: "Yes, I'm doing a record and taking pictures during the learning because of nowadays is more simple rather write notes, and more authentic if compare with making a note".

This activity reflected the participants' actions to access material when they relearn, where they view the photos on their mobile phones rather than accessing the LMS. The key action of the core teachers is to distribute the content material through WhatsApp group chats regularly, where the core teacher ensures that the participants receive the training content for the programme to run smoothly.

The observation form made a note of another challenge. Every time the participants wanted to upload their tasks, the core teacher would provide a step-by-step explanation on how to upload and submit tasks to the LMS. For example, at activity IN-3, the core teacher explained what the participants did in the LMS, but the responses showed that the participants did not know how to upload. Even though there is a topic at the beginning of the program (IN-1) introducing the LMS and its operations, the DMR records showed that there was a problem with access (submitting) and connection to the LMS by several participants on a laptop; thus, several participants accessed the LMS through their mobile phone. It seems like participants were less knowledgeable about the LMS and not familiar with the LMS facilities. The problems with the LMS could also be from the system. For example, one core teacher said in the class:

SGI : "... As we know that. There are many complained about the LMS. Some participants said that they cannot open the LMS. That's right, some people said the system is not full ready yet or It's probably many people use this LMS. However, to solve this problem all participants can send tasks and assessment to me directly or send through a group WhatsApp. I must remark and giving score to each participants started from IN 1 until IN 5 and directly upload in each activities. Even then the LMS we have different with participants. We have a special line by directly to the central program by email or WhatsApp. However, when LMS is ok, all participants can upload it again".

During the training session, it was noted from the observation that the core teachers helped some participants to submit and upload the tasks, and the core teachers helped to upload from their access facilities. DMR recorded that all participants attended, uploaded their tasks, and received feedback notes from the core teachers at the end of the program.

In general, the LMS assists the learning process on the NTP. There are two types of LMS versions to access, the mobile version and the web version. The core teacher downloaded the program's content and material through two access sources, LMS or open source official website from MoEC RI. Besides, the participants were regularly active in accessing the LMS. However, the participants faced a challenge in using the LMS in the programme. There are two types of issues in using LMS: difficulty accessing the LMS and less LMS activity. The first issue is the difficulty of accessing the LMS, mostly coming from the centre of the system and uneven broadband cable and wireless connection in the Cigombong District. This situation led to the participants' struggle to access the LMS. The second issue is activity on LMS. The participants conducted activities in LMS by completing tasks and assessments. However, the participants were not using the LMS facilities such as forum chat and video call application. Furthermore, the challenge is related to the connection, access, and system of the LMS and the knowledge of participants. A participant who has less knowledge in using the LMS would be unfamiliar with the LMS facilities. Even though the LMS reported that the actual implementation in the Cigombong District is complete, and almost 100 per cent of the participants participated in the programme and the LMS, using the LMS is quite a challenge in the Cigombong District with unexpected

conditions. A more in-depth analysis is discussed in Chapter 5 (Subsection 5.3.3 on page 174) to face the usage of the LMS in this programme.

4.5.4 The Result of the National Training Programme in the Cigombong District

The NTP assessed the competence of the participants. The training took place over five weeks with the IN-ON-IN strategy, which equals to 82 hours of training (Bestary et al., 2019). There were three types of evaluation consisting of attitude, skill, and knowledge assessment. Teachers were evaluated based on the assessment of activity at the in-service and job training (attitude assessment). They were monitored based on course work and practice report (skill assessment), and tested on their knowledge through online assessments (knowledge assessment) (Handayani et al., 2018). In the end, the government would give the participant a certificate that shows their total mark using two grades, i.e. competent or not competent (Handayani et al., 2018).

The assessment came from the core teachers and the marks depended on their assessment. The core teachers gave marks for the participants' attitude and skill in the LMS. The elements of the attitude assessment included discipline, being active and creative. The core teachers marked the assessment weekly, after the IN activity. One of the discipline elements is attendance in the class, while the active aspect refers to the participant's active participation in class, such as asking, answering, and responding in class, and the creative aspect shows the creativity in developing knowledge in class and doing the worksheet. It was noted that the core teacher encouraged the participants to be active in class and present in class for a total of three times. For instance, the core teachers announce what to present in front of the class after the group work. The average score that the core teachers gave in this assessment is 91 (Table 4-3).

The skill assessment was from the worksheet and practice during the job training section when the participants input worksheets in the LMS. The core teachers and school superintendents gave general comments and feedback directly in a face to face meeting. The observation noted that the school supervisor gave more than three directions during the class session as feedback. The participants did ten tasks during

the training programme, including the best practice reports that several of the participants presented in front of the class as a representative of the participants. In this evaluation, the core teacher had a significant portion to evaluate the participants (70 per cent) rather than the school superintendents (30 per cent). The scores for this assessment are presented in (Table 4-3).

Next, the knowledge assessment was held by the government through the online system. The participants in the Cigombong District did the knowledge assessment after completing three weeks of training. The test was held at 01 Junior High School Ciawi using the computer lab at their school on 30th November 2019. This school was located near the Cigombong District. Knowledge assessment is a combination of general knowledge of the pedagogy and knowledge of HOTS that the participants learnt in the training and the subject matter selected by the learning unit participants. The knowledge assessment consisted of 45 multiple-choice questions, divided into two main parts: pedagogy knowledge (15 questions), and the learning unit that the participants implemented in the training consisted of six questions for each knowledge of the HOTS unit and nine questions on professional content learning unit with a total of 30 questions (Handayani et al., 2018). The participants obtained the result in each part immediately after completing the test. One interviewee explains his result:

NW: "My score is not really good, pedagogy got correct thirteen, fouls two. In learning unit science professional, I forgot."

The LMS of the core teachers recapped the results of all the participants. Table 4-3 defines the results of the participant from three aspects: attitude, skill, and knowledge scores, including the predicate of the participants' ranking.

Table 4-3 indicates that the training's minimum score level was completed by over 70 per cent of the participants. At the beginning and towards the end of the training, the core teacher had announced that the participants would receive a certificate if they obtained an overall final score of a minimum of seventy.

Table 4-3 Results of Participants at NTP in the Cigombong District

No	Initials	Attitude score	Skill score	Knowledge score	Final score	Predicate	Status
1	AK	95	90	77	86	Good	Pass
2	NK	95	90	75	85	Good	Pass
3	MR	95	90	62	80	Good	Pass
4	NW	95	90	64	80	Good	Pass
5	DH	95	87	64	79	Sufficient	Pass
6	HN	95	87	64	79	Sufficient	Pass
7	SSC	95	90	60	79	Sufficient	Pass
8	AR	95	90	57	78	Sufficient	Pass
9	VS	95	90	55	77	Sufficient	Pass
10	SSS	88	87	57	75	Sufficient	Pass
11	DL	88	87	60	74	Sufficient	Pass
12	LH	88	87	53	73,77	Sufficient	Pass
13	ID	95	87	42	71	Sufficient	Pass
14	II	88	87	44	70	Sufficient	Pass
15	SC	88	87	42	69	Fair	Not Pass
16	EM	88	87	42	69	Fair	Not Pass
17	EC	88	87	40	68	Fair	Not Pass
18	TW	95	87	31	66,5	Fair	Not Pass
19	SS	88	87	35	66	Fair	Not Pass
20	RC	88	87	31	64	Fair	Not Pass

Table 4-3 shows that six participants scored below the standard minimum score. The majority of participants who did not pass failed in the knowledge assessment. Some of the interviewees explained why they obtained a weak score in the knowledge assessment. As one interviewee said:

AR: *"That's the problem, sometimes we are constrained by other assignments and tasks, sir, we rarely open up the material".*

Nevertheless, over half of the interviewees frequently viewed the training materials after the training, which most of them studied on their mobile phones. The DMR noted that the participants and core teachers shared content more than four times before the

exam; they shared through the WhatsApp group on the mobile phone rather than on the LMS. One interviewee supported that:

NW: *"Of course, It is almost a few weeks had passed. I read and re-read from the beginning of the training activity, including the post-test questions given by core teacher".*

Thus, it seems that the majority of the participants who took photos and recordings used them to revise after the training ended, with the hope to re-read the content before the exam. Even though the fact provides the opposite action for some participants, most participants re-read the material before the exam. A more in-depth discussion on the factors faced by the participants when not passing the training is in Chapter 5 (Subsection 5.3.5 on page 202).

To summarise, four items were explored in this section. The first is the comparison of the guidebook with the actual implementation of the NTP in the Cigombong District. The comparison result shows that the implementation of the programme in the Cigombong District is a success. The local authority moderately followed the rules planned in the guidebook by running smoothly with three strategies: In-service training, On the job training, and LMS for mentoring. The second is mobile phone activities during the training programme. The core teachers allowed the participants to use their mobile phones during the session actively. The participants utilised their mobile phones during the NTP through two actions, namely the physical actions and knowledge exchange between participants. The third is the implementation of the LMS on the NTP in the Cigombong District. The LMS monitored the online activities of the participants, where they completed the tasks and assessments on the LMS. Nevertheless, the participants did not maximise the LMS facilities, such as video calls or chat forum. The fourth is the participants' results from the Cigombong District in the NTP. The NTP assessed the competence of the participants from a three-element evaluation consisting of attitude, skill, and knowledge assessment. The assessment was from the core teachers and depended on them to assess accordingly. The knowledge assessment was held by the government through an online system. The LMS of the core teachers recapped all the participants' results, in which over 70 per cent of the participants passed and received the NTP certificate.

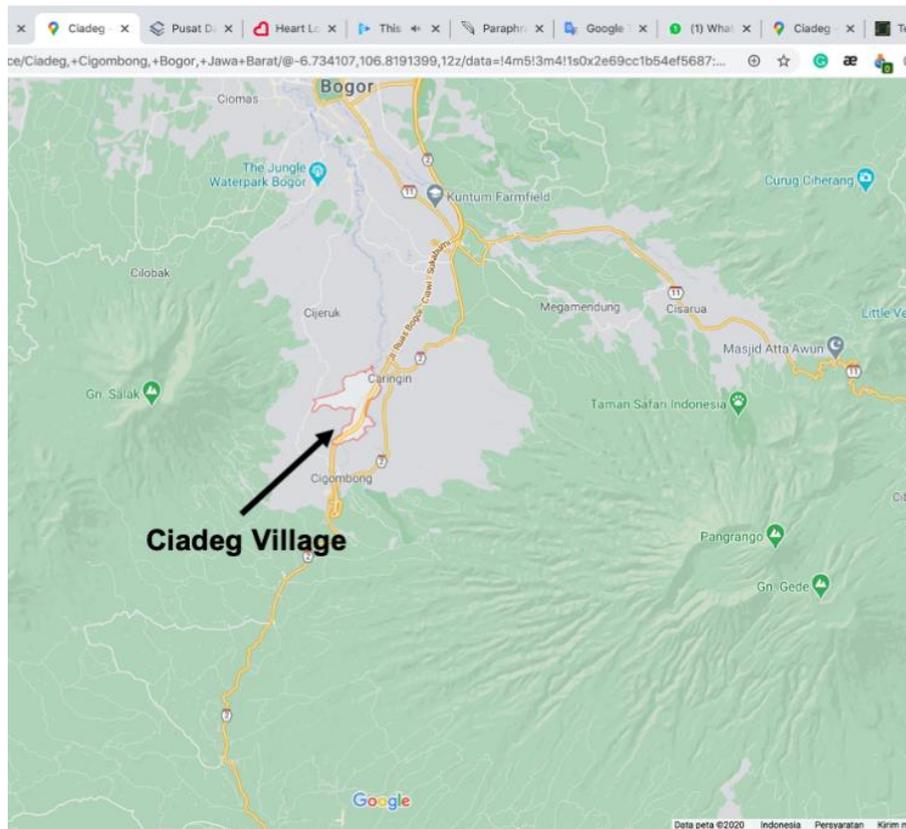
4.6 The Dissemination Programme in the 08 Ciadeg Teacher Working Group

The purpose of this section is to explore the implementation of dissemination after the NTP in the Cigombong District to the 08 Ciadeg Teacher Working Group (08 Ciadeg TWG). The aim of the DP is for knowledge exchange between participants who completed the NTP in the Cigombong District. This activity is part of the national framework for continuous teacher professional development where the dissemination activity is held in TWG after the NTP. Thus, this activity can be part of the knowledge exchange between members of the teacher working group to continue the teachers' professional development. After completing the NTP, the researcher undertook an in-depth examination with seven participants, whom the researcher referred to as facilitators for the DP in 08 Ciadeg TWG. Furthermore, concerning this study, the focus was on seven facilitators for this research rather than the DP participants to exchange their knowledge by showing how deep and implicit the knowledge they obtained through this activity and focused on their mobile phone transactions. The knowledge exchange exam will be discussed in the next chapter (Subsection 5.3.6 on page 211). Thus, this section explores the implementation of the DP itself. This activity was held in a community of teachers named 08 Ciadeg TWG. Several data, such as interviews with seven teachers from Ciadeg Village, observation on these teachers to disseminate their knowledge, and DMR such as videos, audio recordings, photos and captured screenshots of WhatsApp chats, were collected to support this study. The study explored the Ciadeg Village as a place of community and continued exploring the community and the DP itself.

4.6.1 The Ciadeg Village is Part of Cigombong District

The Ciadeg Village is one of the villages in the Cigombong District. According to Village Development Index, the Ciadeg Village is classified as a developing village (Kemendesa, 2020a). The satellite image shows precisely where the Ciadeg village is located (Figure 4-10).

Figure 4-10 The Topography of Ciadeg Village



The picture above shows that the topography of Ciadeg Village is on the slope of Salak Mountain. It means that this village is located on Salak Mountain. There are 3,235 family members in the Ciadeg Village and six public primary schools surrounding Salak Mountain (Dapodik, 2020; Kemendesa, 2019).

There were inconsistent infrastructures in Ciadeg Village. Some areas in the Ciadeg Village is rather difficult to be accessed. Nowadays, however, most road access is asphalt, which makes access to Ciadeg easier, as the school superintendent explains:

WW: "This Ciadeg Village is not far from the Cigombong district but the location is so difficult to be accessed from the road. There are train tracks, and the hill roads are up and down. However, nowadays there are many asphalt roads. So it's easier to access Ciadeg, but, in Ciadeg areas. There is a public primary school that is difficult to be reached due to its location under railroad tracks such as 03 Ciadeg primary school. However, the location can only be reached by motorcycle. Actually, the location is not remote but a little hard to be reached".

This conversation shows that there is an inconsistent condition in Ciadeg Village. For instance, most of the schools are located under the hill of Salak Mountain. The majority of interviewees from Ciadag lived in the school's surrounding area and informed that schools are located under the slopes of Salak Mountain, which are difficult to access through cars and public transportation. One interviewee said:

SSC: "Actually, 04 Ciadeg is a part of remote areas. In the previous condition, there is no road access for a car. Nowadays, however, the car can have access to school. This school is also one of the remote schools. Geographical conditions have many gardens, in mountainous areas as well..."

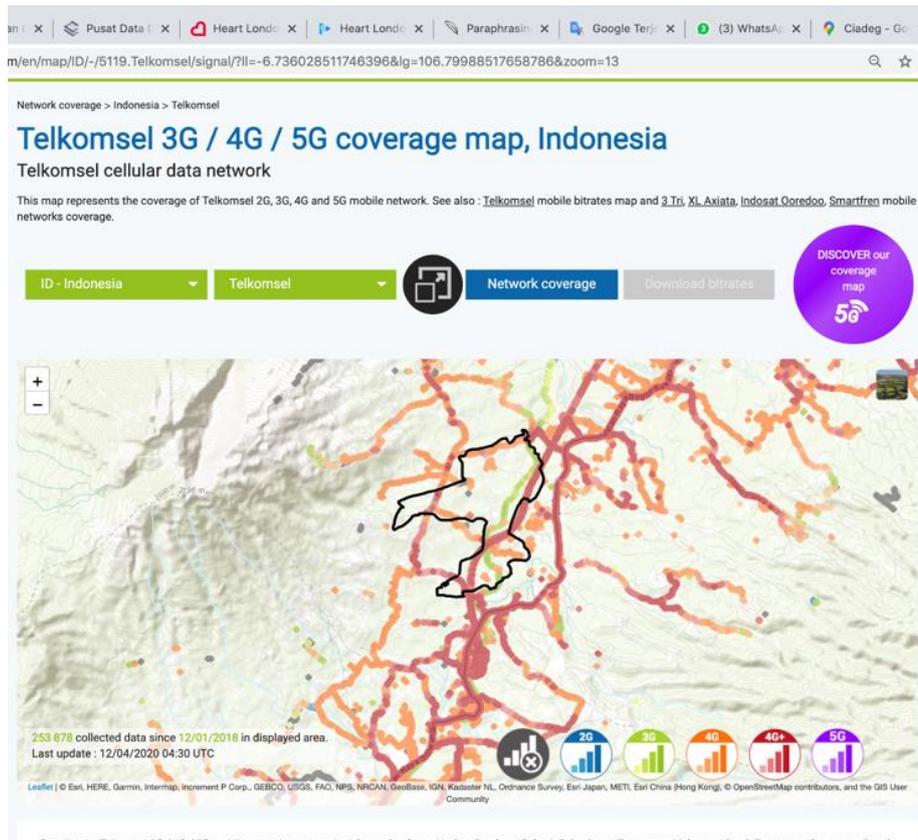
While a minority stated that the schools' location is easy to access by car and public transportation, most of the interviewees agreed that most public primary schools in the Ciadeg Village are not easy to access by car and public transportation but can be accessed by motorcycle. All these conditions led to Ciadeg Village being in the category of developing village.

The broadband cable connection in Ciadeg Village is limited. The connection of cable internet is more or less the same with another village in the Cigombong District. The Ciadeg zone is part of the supporting programme by the 'palapa ring' (national programme) and 'desa digi' (province programme) through the internet connection facility, which is cable networking in the Cigombong District. However, the cable internet connection is limited and more expensive. As one interviewee said:

SSC: "We haven't used cable internet yet. In the past, we try to use cable internet at school, but it is far from internet substation which is at Kaung Luwuk. After we calculate per meter, the total is three millions rupiah. So we discuss it later with headteacher"

There is limited cable connection for internet, but this area is covered by a broadband wireless connection, with six tower base transceiver stations (BTS) in the Cigombong District that also covers Ciadeg Village (Kemendesa, 2020b).

Figure 4-11 Cellular Company (Telkomsel) Cover Signal Surrounding the Ciadeg Village



The picture above shows that Ciadeg village has broadband connection with 2G until 4G. However, some areas are blank spots, or some areas do not have cellular signal and internet connection. This means that there is an uneven broadband wireless connection in Ciadeg Village.

In general, Ciadeg Village is one of the villages in the Cigombong District which is a representative of the villages in the Cigombong District. There are uneven infrastructures in Ciadeg Village that categorised this village as a rural area with unexpected conditions where teachers struggle to connect to the outside world not only physically but also by communicating with others through the internet.

4.6.2 The Implementation of the Dissemination Programme in the 08 Ciadeg Teacher Working Group in Ciadeg Village

The dissemination activity conducted in Ciadeg Village was held after two weeks of completion of the NTP in the Cigombong District. Seven participants from the NTP disseminated their knowledge to other members in the teacher working group through this activity. This activity is known as the DP in the 08 Ciadeg TWG. Table 4-4 is a list of the seven participants that were named as facilitator.

Table 4-4 List of Seven Members of Ciadeg 08

No	Facilitator	Gender	Teacher Working Group	Original School	Status	Training Result
1	SSC	Female	08 Ciadeg	SD Ciadeg 04	Civil Servant	Pass
2	EC	Male	08 Ciadeg	SD Ciadeg 06	Contract	Not pass
3	II	Female	08 Ciadeg	SD Ciadeg 02	Contract	Pass
4	NW	Female	08 Ciadeg	SD Ciadeg 03	Contract	Pass
5	NK	Female	08 Ciadeg	SD Ciadeg 03	Civil Servant	Pass
6	EM	Female	08 Ciadeg	SD Ciadeg 05	Contract	Not Pass
7	SC	Female	08 Ciadeg	SD Ciadeg 01	Contract	Not Pass

Table 4-4 above shows the demographic profiles of the facilitators. The facilitators were mostly from the 08 Ciadeg TWG. Seven facilitators mentored their members of the 08 Ciadeg TWG in knowledge of HOTS. Even though some of the facilitators did not pass the NTP, but upon examining their knowledge and in-depth knowledge through activities in the NTP and their transactions on the mobile phone as surface knowledge, they were ready to mentor. In the next chapter the research focuses on transactions through the mobile phone rather than face-to-face activity. Thus, this subsection focuses on exploring the implementation of the DP rather than examining the knowledge of facilitators in knowledge exchange.

The 08 Ciadeg TWG is part of community teachers in the Cigombong District. The total community members are 55 primary teachers from six public schools in Ciadeg Village, with 1,370 students and a school radius of more or less one to two kilometres from each school (Saefudin, 2019). Moreover, most of the members had graduated from the university, where over half of the teachers were contract teachers rather than

civil servant teachers. The 08 Ciadeg TWG has two groups of levels, namely teachers who teach in the lower class (Grades 1-3), and those who teach in higher levels (Grades 4-6). This community was founded in 2009 and routinely active with or without government budgeting, such as pedagogy activity and professional activity (Saefudin, 2019). Moreover, all the facilitators were supported by the head of schools to share and disseminate their knowledge through the dissemination activity in the 08 Ciadeg TWG.

A member of the teachers who teach in the second key stage took on the dissemination with 19 participants. The head of schools from this community supported this activity, as all the facilitators said in the interview that they received support to share and disseminate the results of the national training. As one facilitator said:

EM: "Like we are doing now that we have tasks as a part of dissemination. So we sacrifice students. We must discuss in office, the head school is giving permission and time for us to be discuss as long as we can organise the condition of children in class so that they are not noisy".

Moreover, one of the headteachers had given their facility as their school was used during the IN activity and a place for practice for the ON job training, the 02 Ciadeg Primary school.

The implementation of dissemination adopted a similar system with the NTP. Core teachers and facilitators created the same strategies as the national training, in which this activity used face-to-face (IN and ON) and the LMS as a source of content and assessment. All the material and sources were taken from the national training. The implementation started on 16th November 2019 until 14th December 2019, in the 02 Ciadeg Primary School.

Figure 4-12 Learning Activities in the Ciadeg Village

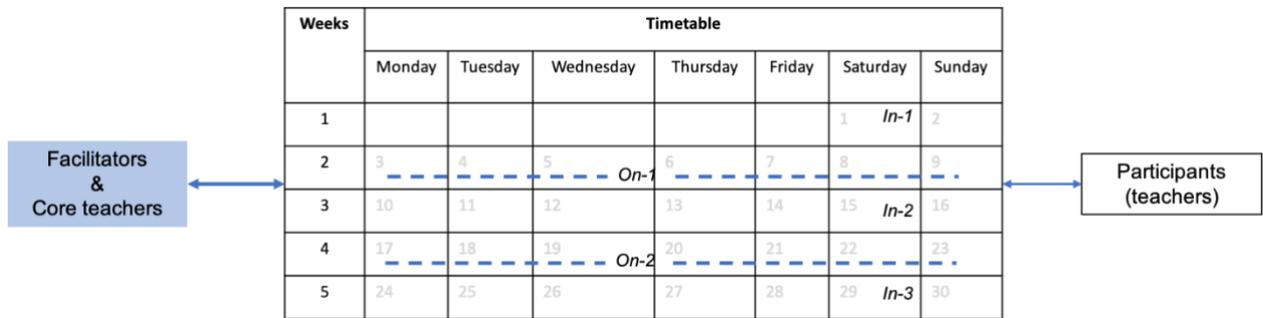


Figure 4-12 describes the pattern of activity dissemination in Ciadeg Village, where one month was used to implement the programme. The in-service training activity was held three times, and on the job training was held two times. This pattern followed the pattern of the NTP that the facilitators had taken.

The core teachers and facilitators aligned the dissemination with the learning activity of the school schedule. The DMR data shows that the activity time was changed more than twice because it clashed with the end of semester assessment. Moreover, the observation form noted that the in-service training activity was held three times and two times on the job training with two weeks between the IN activity. They did this because of the density of learning activities in school. The schedule is not strict like the NTP with the ability to adjust their time to do this activity. Thus, there is a modified pattern from the NTP.

The facilitators got accompaniment from the core teachers. The DMR noted that two facilitators acted as speakers in front of the class, and the rest accompanied a small group. The observation data noted that the core teachers always attended the face to face activity. Furthermore, the interview data shows that half of the facilitators were not fully confident in sharing their knowledge after their national training, as one facilitator said:

II: *“Before I may not have understood anything even though I got it at TWG, but after training, I gradually understood it. However, if I've conveyed to students, I'm implementing half or fifty per cent because the student characteristics are different from those of urban students”.*

Another capture showed that the facilitator discussed and asked the core teachers to ensure the content and programme through the WhatsApp group chat for more than three times; Table 4-5 shows a sample conversation.

Table 4-5 Conversation Chat Facilitator and Core Teacher in Chat Group 'PKP Gugus Ciadeg'

Date & Time	ID	Conversations
[21/11/19 05.56.50]	SSC:	<i>Excuse me, worksheet four about assessment HOTS and worksheet five about design lesson plan is part of task On the Job one... It's should be observed by a school supervisor or not. Is there any schedule for mentoring from the school supervisor or it is enough from the facilitator?</i>
[21/11/19 05.58.12]	SSC:	<i>Tap Mr and Mrs core teachers.</i>
[21/11/19 05.58.43]	SGI:	<i>Yes mam, Keep up the spirit, If you have finished the task IN 1, continue to assign ON1. Please keep asking for guidance through each facilitator. However, counselling will be held at ON 2 by supervisor. Don't forget for another task on a worksheet than uploading and sending to facilitator too. Facilitators will report to 08 Ciadeg TWG and Watesjaya TWG. 🙌</i>
[21/11/19 06.02.12]	SSC:	<i>Alright sir, many thank...👍</i>

Thus, facilitators were monitored by the core teacher. Even though the facilitator was at the frontline on this activity, the core teacher accompanied the participants in class session (IN) and on practice (ON), and remarked on the assessment by the core teachers. Moreover, the facilitators always coordinated through mobile phones with the core teachers and school supervisors before giving the knowledge and activities to make sure it was the right action. Therefore, the core teachers and school supervisors took responsibility for this activity. Even though this activity was an initiative from the facilitators and core teachers, the control was on the core teachers.

4.6.3 Mobile Phone to facilitate Participants in the Dissemination Programme

Technology was utilised in the activity of exchanging knowledge in the 08 Ciadeg TWG. The facilitators and core teachers used mobile phones and the LMS to support this activity. For instance, the 08 Ciadeg TWG leader asked for help by sending a letter to the Central Data and Information (PUSDATIN) MoEC RI to support their activity. PUSDATIN MoEC RI supported the group by developing the LMS and giving a dissemination certificate to all the participants who joined this activity. The structure of the LMS adopted the system's in-on-in service, and the content of the LMS was taken from the PUSDATIN MoEC RI platform, which the NTP used this platform as a source of learning for participants of the national programme. This platform was used to introduce the activity and knowledge as part of the HOTS skill and content of national training for everyone. The participants accessed the dissemination content through the LMS by accessing simpatik.belajar.kemdikbud.go.id to do the tasks, assessment, and reporting. Moreover, the LMS can be accessed through the mobile version, which PUSDATIN MoEC RI had previously created for another purpose.

Furthermore, mobile phones supported the activity of dissemination in the 08 Ciadeg TWG. The DMR noted that all the dissemination participants had a mobile phone in their hand, and they were active in using the mobile phones during the dissemination without any restrictions on its use. The DMR noted that the core teachers and facilitators used the WhatsApp application for communication and transferred the material and information through this application. Thus, there was a big group in WhatsApp, with 29 members consisting of the participants, facilitator, core teacher, and school supervisor, that the facilitators had already created in the early Dissemination Programme named "PKP Gugus Ciadeg".

However, the DMR showed five small WhatsApp groups with six or seven members, including two or three facilitators mentoring to bridge the knowledge gap with the participants by labelling the group chats "PKP Ciadeg group one until five". Moreover, the facilitators and core teachers made a small group for themselves on WhatsApp with nine members, "PKP KKG 08 & 02". Thus, there were seven groups in WhatsApp, consisting of one big WhatsApp, five small WhatsApp groups, and one small

WhatsApp group which contained the facilitators and core teachers to support this activity only.

Table 4-6 Facilitators and Core Teachers in Chat Groups ‘PKP Gugus Ciadeg’

No	Small WhatsApp Group						
	“PKP KKG 08 & 02”.	PKP Ciadeg group one	PKP Ciadeg group two	PKP Ciadeg group three	PKP Ciadeg group four	PKP Ciadeg group five	PKP Gugus Ciadeg”.
Total distribution of Frequency texting/sent emoji/PDF/Doc/image	498	412	173	655	372	141	420

Table 4-6 describes the total number of texts, sent emojis, PDFs and images that the participants, core teachers, and facilitators distributed in the WhatsApp groups from the beginning of dissemination until the end of the activity. Additionally, the study downloaded all the conversations and input to the NVivo software to further analyse the conversations which focused on how the facilitators used this technology for the transaction of knowledge. The data showed that the facilitators’ contribution was in texting and sending messages through the WhatsApp group, not only in the “PKP Gugus Ciadeg” WhatsApp group but also in the small WhatsApp groups including personal chats on WhatsApp. As one core teacher said:

SGL: “Almost of facilitator ask me through WhatsApp privately or group related to the content”.

Thus, the mobile phone is a device to communicate between the facilitator and core teacher and the facilitator's communication bridge to transfer their knowledge to the participants. Besides that, several transactions on the mobile phone were analysed to develop a facilitator's understanding of their knowledge. This analysis is part of the second unit of the case studies which would be analysed to explore mobile phones in the implementation of the facilitator's knowledge after the NTP to look at how deep

and implicit their knowledge is rather than look at the national training result; this will be analysed in Chapter 5. Twenty participants were involved in this case study, which involved an interview, digital media records, and observation to explore the implementation of cases in the first unit of a case study.

4.7 Summary

This chapter aimed to explore the implementation of the NTP in the Cigombong District and DP in Ciadeg Village. Exploration is an inseparable part of the case study in this research, which started from location, infrastructure, demography of the teachers, and utilisation of mobile phones for teachers in the Cigombong District, followed by the implementation of the NTP in the Cigombong Zone and DP in the Ciadeg Village. The exploration started in October until December 2019, focusing on NTP and DP for knowledge exchange participants in the TWG.

The Cigombong District is a rural area in the Bogor Regency. The Cigombong District's topography is a hill and mountain area with nine villages, and one of them is Ciadeg Village. The teachers' residences are near the school's location, most of which are hills and highlands, and they accessed school by motorcycle or walking. The geography aspect of the Cigombong District is a new town for two administrative regencies in which several infrastructures are ready in the district, such as physical and communication infrastructures. Nevertheless, the Cigombong District has an inconsistent condition in infrastructure building, access, and communication. For instance, the school conditions are not 100 per cent in good condition for most schools, and most do not have science labs and libraries. Another sample is the lack of access to the Cigombong District, where most villages are hard to access by public transportation and car. The struggle for broadband cable connection and broadband wireless access was seen in the Cigombong District, where some areas do not have a telephone signal or wireless connection. Even though there is a lack of physical and communication infrastructures in the Cigombong District, at present, the government has recently improved the infrastructure in the district.

Teachers who teach in the Cigombong District have appropriate qualifications in education level and experience to teach. The majority of the teachers teach in primary

schools. The qualification of the teachers in the Cigombong District is a bachelor of education degree with the vast majority aged 20 to 40 years old. There are two types of teacher status: contract teacher and government service teacher, which status of most of the teacher population is contract rather than government service, and most teachers live in the Cigombong District. Less than half of the teachers have a professional certificate in the Cigombong District. On the contrary, teachers have no different service to improve their knowledge, pedagogical skills, and professional approach, particularly in continuing professional development in the Cigombong District, and most of the teachers have competent skills to operate a mobile phone.

Teachers in the Cigombong District felt more comfortable using a mobile phone rather than other devices. They use a mobile phone for two main activities: daily routine and learning support, which most teachers use for both activities. In daily activities, teachers use mobile phones not only for communication but also to search news, information, entertainment, playing games, and business. A teacher uses WhatsApp to communicate and share information with all the members around them. Moreover, teachers use Google to search for information, supporting day to day activities. WhatsApp, Google and YouTube are the most favoured applications and most commonly used for daily routine activities in the Cigombong District for teachers. Simultaneously, mobile phone as a learning support is divided into two types: mobile phones that support the class's learning process and support continual teachers' professional development. The purpose of the mobile phone supporting the learning process in class is to help teachers find the information connecting to context or learning content. Conversely, mobile phones support continual teacher professional development by searching for information around professional and pedagogy knowledge.

There were four items explored in the implementation of NTP in the Cigombong District. These items consist of comparing the guidebook with the actual implementation of the NTP in the Cigombong District, mobile phone activities during the training programme, implementation of the LMS on NTP in the Cigombong District, and participants' result from the Cigombong District in the NTP. The first is a comparison between the guidebook and the actual implementation of the NTP. Overall, the implementation of the NTP in the Cigombong District was run smoothly

and successfully. The local authority moderately followed the rules planned out in the guidebook with three strategies: in-service training, on the job training, and LMS for mentoring through satisfactorily organise by providing the facilities and infrastructure. The programme was held for five weeks, starting on 5th October until 2nd November 2019, where the total participants were 20 teachers from seven TWGs in the Cigombong District. The participants were possibly the best teachers among the Cigombong District teachers and the most active in any teacher working group activity. Presumably, there is no connection with the teacher's status in this programme as long as the teachers suffice the above criteria. However, there are inconsistencies in several sections on face-to-face training and the LMS used as a mentoring system, but it seemed like the local authority obeyed the manual book. Even though some aspects have problems, most participants can face and succeed in the training journey.

The second is mobile phone activity during the NTP. The participants were active in all training sessions, and active participants used a mobile phone during the training program without any interdiction. The core teachers did not restrict the participants from using mobile phones because the mobile phones were used to support the learning process during the programme. Moreover, there were two main activities of using a mobile phone in this training programme. The first is physical actions that participants use to take a photo, record the material and modem of the internet, including the tool for reading the module. The second is in exchanging participants' knowledge and transactions through the mobile phone besides being used to communicate with other participants outside the class and sharing knowledge with other colleagues in school.

The third is an implementation of the LMS in NTP in the Cigombong District. The LMS assists the learning process in the NTP. There are two types of versions to access the LMS, namely mobile and web versions. Furthermore, the learning source could be downloaded in two ways: using the LMS or open source official website from MoEC. There were two types of issues to use LMS in the Cigombong District: difficulty accessing the LMS and less activity on LMS. The first issue of difficulty accessing the LMS came from the centre of the system and uneven broadband cable and wireless connection in the Cigombong District. This situation led to the participants struggling

to access the LMS. The second issue is the activity on the LMS. The participants were active in completing the task and assessment, which they submitted in the LMS, but they needed extra effort to access the LMS. The participants did not maximise the LMS facilities such as forum chat and video call application. Furthermore, the challenge is not only to connect, access and system of the LMS but also the knowledge of participants is less knowledge to use the LMS, which the participants are not familiar with the LMS facilities.

The fourth is the NTP result in the Cigombong District. The NTP assessed the competence of the participants with three elements, namely attitude, skill, and knowledge assessments. Attitude and skill assessments came from the core teachers and superintendents, and the government held a knowledge assessment through online systems. The LMS of the core teachers recapped the result of all participants. The LMS reported that over 70 per cent of the participants passed the NTP with a minimum score of 70 and got a competent certificate to teach with the HOTS approach. The majority of the participants who did not pass failed the knowledge assessment.

Furthermore, the DP in the 08 Ciadeg TWG was explored in this section. The DP aims to have a knowledge exchange activity with the participants who finished the NTP in the Cigombong District. This activity is part of the national framework for continuing teachers professional development. The DP was held in the TWG after the NTP. The exploration took seven participants who completed the NTP, who were named facilitators rather than DP participants. The exploration started from Ciadeg Village as a place of community and continued to explore the community and the DP itself.

The first is the Ciadeg Village is the representative of the villages surrounding the Cigombong District. This village is a developing village according to the Village Development Index. The topography of Ciadeg Village is hilly in the slope of Salak Mountain. The infrastructure in Ciadeg Village is irregular, such as difficult access to the village and limited access to broadband cable and wireless connection. The second is a teacher working group in Ciadeg Village named 08 Ciadeg TWG. This community is part of several teacher communities in the Cigombong District. Fifty-five teachers were from six public schools in Ciadeg Village with the location at the slope of Salak Mountain. The majority of the members graduated from university, where over

half of the teachers were with the status of contract rather than a government servant. The 08 Ciadeg TWG has two group levels, namely teachers who teach in the lower level class (Grades 1-3) and those who teach in the higher class level (graded 4-6). This community was founded in 2009 and routinely active with or without budgeting from the government, such as pedagogy activity and professional activity. The head school supported the dissemination activity by permitting teachers to join the seven teachers.

The third is the DP implemented in the 08 Ciadeg TWG. The information was disseminated to 19 teachers who teach in Grades 4-6 in primary schools. The implementation of the dissemination programme adopted a similar system with the national training are received help from Pusdatin MoEC. The core teachers and facilitators created the same strategies as the NTP, which this activity used face to face (IN and ON) and the LMS as a source of content and assessment. All the materials and sources were from the NTP. The implementation took one month and started on 16th November until 14th December 2019, at 02 Ciadeg Primary School. The in-service training activity was held three times, and two times on the job training with two weeks between the IN activity.

Furthermore, the facilitators got accompaniment from the core teachers who monitored the facilitators on the activity and accompanied the participants in practice (ON the Job training) as well as remarked on the assessment by the core teachers. The facilitators used mobile phones to coordinate before giving the knowledge and activity to ensure they were right. Thus, the core teachers and school supervisors felt responsible for this activity and even though the facilitators and core teachers initiated this activity, the control was on the core teachers. The facilitators and core teachers used technology to support the dissemination activity. One of them is mobile phones which supported the dissemination activity in the 08 Ciadeg TWG. All the participants of the dissemination activity had mobile phones in their hand. The core teachers and facilitators created a WhatsApp group for communication and transferred the material and information through this application with 29 participants, facilitators, core teachers and school supervisor. Moreover, the facilitators created five small groups of WhatsApp with six or seven members, including two or three facilitators, and created a small group for the facilitators and core teachers only. So, there were seven groups

of WhatsApp in this DP. Several transactions on the mobile phone were analysed to develop a facilitator's understanding of their knowledge. This analysis is part of unit two of the case study that was analysed to explore the mobile phone in implementing the facilitator's knowledge after the national training to look at how deep and implicit their knowledge is rather than looking at the national training result. An in-depth explanation is provided in more detail in the next chapter as a unique message about mobile phone implementation on this activity in Chapter 5.

Chapter 5

Analyses and Discussion

5.1 Chapter Outline

The preceding chapter explores the implementation of the National Training Programme (NTP) in the Cigombong District and the Dissemination Programme (DP) at the Teacher Working Group (TWG) in Ciadeg Village, how it works and its success in implementing the programme. Building on these implementations, this chapter aims to examine the implementation by discussing and criticising the literature in the education field. The importance of this chapter is twofold.

Firstly, it provides the themes that emerged related to the use of mobile phones in the national framework. This chapter explores several themes that appeared during the implementation programmes. The themes were weaved through participants' talks, capturing action in the digital media record, observation form, conversations by WhatsApp on the mobile phone, and an interview. These themes illuminated the privileged messages in the National Training Program (NTP) and Dissemination Programme (DP) and the boundary and relationship between technology and teacher knowledge to continue teachers' professional development.

The second, it develops and examines mobile phone usage by answering the research questions through discussions and criticising multi-reference literature. Therefore, the mobile phone's affordances were explored. However, the nature of affordances means that every time participants use the device, there is a new opportunity for researchers to gain a deeper understanding of mobile phones to support continued teachers' professional development. This chapter starts by exploring the source of data and themes that appeared during the implementation of the NTP and DP and answers the research question by discussing multi-reference literature.

5.2 Source of Data

The purpose of this subsection is to describe the allocation of data sources for the research. This section reveals the sources of data to give a clear image of this research. Moreover, the researcher collected raw data, which forms the main basis for achieving the research objectives. Lune and Berg (2017) supported that data collection and organisation are critical in unfolding the research project and researchers must also imagine what the data will look like. Besides, the source of data is evidence in the case study. Yin (2014) indicated that there are numerous data sources for evidence in a case study. She indicated six data sources commonly used in a case study: documentation, archival records, interviews, direct observation, participant observation, and physical artefacts. Moreover, the researcher explained a diverse source of data in this research in Chapter 3. Thus, the analysis process comes from the diverse data collected during the research period. The researcher sorted the data through the preparation step and organised the data referring to the boundaries, categories, nodes and codes in the NVivo software, and made patterns in the data to uncover the unique message to explore the conceptual framework and answer the research questions. There is repetition of data shown by the research in Chapter 4 which is used in Chapter 5 to emerge themes and answer research questions with the aim of strengthening information and checking data validation and reliability. In the end, the data will be reported as a case study report through exploration of the conceptual framework into emerging themes and answering the research questions of this case study.

Moreover, the diverse sources assist the researcher in confirming the validity and reliability of research by cross referencing what the participants said with their actions. As a result, the empirical study enabled considerable progress to meet the objective. The research question explored the value of mobile phones on teachers' professional development in the national government training at the Cigombong District and dissemination programme to exchange knowledge at the 08 Ciadeg TWG.

There are three main data sources to support this research (Table 5-1). The data source consists of semi-structured interviews, Focus Group Discussion (FGD), and Digital Media Record (DMR), such as individual posts on chat groups in WhatsApp, photo capture, WhatsApp status, and the official website of MoEC, which was explored

in Chapter 3 (Subsection 3.6.1 on page 82). Table 5-1 illustrates the distribution of data collected from participants in this research. Fifteen of 20 participants were interviewed, six contributed in the FGD, almost all the participants were recorded or captured in the eight WhatsApp groups and captured in six WhatsApp status updates, and over 14 participants were documented by photos. The data sources are essential to help researchers explore the implementation of cases and for the analysis of themes. These activities are part of the organisation of this research.

The sources of data were downloaded and transferred to the Brunel University London cloud. Not all participants contributed to the data, but the data set is sufficient for analysis and answering the research questions because each data point represented the presence of the participants' in activities and strengthened one another. The researcher highlighted the depth of the participants' conversations, status, pictures, and talking to inquire and analyse the research themes, particularly playing mobile phones to support their teacher knowledge. In order to achieve these activities, the researcher used software for efficient processing, namely the NVivo software. The researcher coded, made a node through a comparison diagram, hierarchy chart, explored chat, and visualised the results based on frequently appearing words. Furthermore, the researcher analysed by cross-checking participants' actions with all the data sources. Each node was collected for analysis by cross-checking all data sources to draw a line of action of the participants before moving towards the theme conclusion.

Table 5-1 List of Participants in the National Training Programme in the Cigombong District

No	Initials	Interview Form	FGD Form	Digital Media Record		
				Individual Posts on Eight WhatsApp Groups	Photo Capture	WhatsApp Status
1	SSS			3	3	1
2	HN			22	1	
3	SS			0	3	
4	DH			26	2	
5	ID	1		4	1	
6	LH	1		24	1	8
7	TW			44	1	
8	AR	1	1	29	2	
9	DL	1		20	3	
10	MR	3		51		
11	RC	1		12		
12	AK	1		3		
13	VS	1		20	1	
14	SSC	2	1	249		3
15	EC	2	1	71		
16	II	2		109	1	
17	NW	2	1	349	1	14
18	NK	2	1	730	1	
19	EM	2		160	1	8
20	SC	2	1	101		

5.3 Identifying Themes Related to the Use of a Mobile Phone in the NTP at Cigombong District, and the DP at 08 Ciadag TWG

This section investigates the unique messages referring to participants' activities in the NTP at the Cigombong District and the DP at Ciadeg Village. This investigation explored the data through an inductive content analysis approach with several data sources such as semi-structured interviews, observation, and the DMR mentioned earlier in this chapter. This study decided to analyse the data source through the content analysis technique consisting of preparing, organising and reporting through identifying the concepts in the data and building a systematic account of what was observed, captured, and the emergence of theories through the coding process. The analysis process was explained in Chapter 3 (Subsection 3.6.2 on page 92), and the researcher presented and contributed in a proceeding paper to the staff and students at the Brunel University conference in July 2021 to show the understanding of the researcher in this analysis process.

Furthermore, the researcher started to judge the data through analysing, organising, and reporting them in a relevant and meaningful manner. The researcher immersed himself in the data as a preparation process and obtained a sense of the whole by selecting nodes and codes for analysis, and deciding on the analysis of manifest content or latent content by reading activities and reading the data many times to look at the content. Many studies are unsuccessful and researchers find themselves hopelessly lost, even after taking several research courses because they do not know what to do with all that collected data (Lune and Berg, 2017). This study used the content analysis approach explained in Chapter 3 (Subsection 3.6.2 on page 92). This study highlights the depth of inquiry and analysis using software with efficient processes such as clustering, connecting, interrogating data, and visualising results while using various data sources. Computer-Assisted Qualitative Data Software (CAQDS) can help researchers analyse their data, but they cannot analyse the data for researchers. The researcher also needs to exercise flexibility, creativity, insight and intuition (Bacon-Shone, 2015). The process of data analysis continues until the data is enough to describe the conceptual framework and answer the research questions.

This subsection is part of the report of activities, which is not separate from the previous chapter to explore the conceptual framework of this study. The exploration started with the boundary of rural areas to show that the Cigombong District is a rural area with unexpected conditions and continues to the second boundary that exposed the themes around CPD activity by analysing the participants' activities using mobile phones in the NTP in the Cigombong District and the DP at the 08 Ciadeg TWG. The themes in this study emerged as part of a conceptual framework that the researchers proposed.

Each boundary has categories and sub-categories before emerging the themes that the research shows in Tables 3-4 (on page 94) and 3-5 (on page 95) as examples to describe the boundary and category analysis in this research. Some expert argues that theme identification is one of the most fundamental tasks in qualitative research. Furthermore, qualitative researchers rely on presenting key themes supported by quotes from the participants' text as the primary form of analysis and reporting of their data. The themes that emerged relied on nodes and codes in each sub-category that the researcher made up in the NVivo software. The constructed themes emerged as a result of repeated discussions with supervisors, a review of existing literature, and reference to a conceptual framework created by the researcher. In addition, a description of the process provided detailing key steps to bolster transparency and enable replicability (Aguinis and Solarino, 2019; Morrow, 2005). The data gathered was transcribed and subjected to content analysis.

Six themes emerged from this research as shown in Table 5-2. The emerging themes were detected when the researcher analysed the Cigombong District location and continued to analyse activity in the NTP at the Cigombong Zone and DP at the 08 Ciadeg TWG. Thus, *the 'Aha' condition Cigombong District* and *My phone and I are friends* are two themes that appeared when the researcher analysed the Cigombong District's location. Further to that, four themes emerged when this study analysed the CPD activity at the Cigombong District on *'all-around' mobile phones; WhatsApp contribution in national framework; surface learning* and *deep learning* (Table 5-2).

Table 5-2 Themes that Appeared During the Research

No	Boundary	Category	Subcategory	Themes
1	Rural area	Cigombong District	Condition of the Cigombong District	<i>"Aha" condition at Cigombong District</i>
			Profiles of teachers at the Cigombong District	
		The utilisation of mobile technology at the Cigombong District	Type of familiar mobile device	<i>My phone and I are friends</i>
			Utilisation of mobile phones for routine activities and education learning process	
2	CPD activity (National Training Program framework at the Cigombong District and Dissemination Programme at the 08 Ciadeg TWG)	Mobile phone activity during the National Training Program and Dissemination Programme	Mobile phones assist in accessing the LMS	<i>All-round mobile phone</i>
			Mobile phones as a tool device	
			Mobile phone activities during the training session	
			WhatsApp as informal facilities	<i>WhatsApp contribution in national framework</i>
		Teacher knowledge	Surface learning	<i>Surface learning</i>
			Deep learning	<i>Deep learning</i>

5.3.1 "Aha" Condition at the Cigombong District

The first theme is the *"Aha" condition at the Cigombong District*. The theme of this was revealed from the boundary of a rural area with the category the Cigombong District, divided into two sub-categories: condition of the Cigombong District and profile of primary teachers at the Cigombong District. Each subcategory comprised NVIVO

software codes that inferred the meaning of the challenging situation in the Cigombong District. The following theme emerged from the data; the Cigombong District location, the Cigombong District's infrastructure, the demography of teachers at the Cigombong District, and the profile of primary teachers at the Cigombong District (Table 5-3).

Table 5-3 Supporting nodes for 'Aha' Condition in the Cigombong District Theme

Category	Sub categories	Nodes	Themes
Cigombong District	Condition of the Cigombong District	Location	<i>"Aha" condition in Cigombong District.</i>
		Infrastructure	
	Profile of teachers at the Cigombong District	The demography of teachers in the Cigombong District	
		Profile of primary teachers at the Cigombong District	

Table 5-4 Data Source for 'Aha' condition in the Cigombong District Theme

Sub categories	Nodes	Source of Data			
		Semi-structure Interview	Observation	FGD	DMR
Cigombong District	Location Cigombong District	V			V
	The infrastructure of the Cigombong District	V	V		V
Profile teachers at the Cigombong District	Demography of teachers in the Cigombong District	V	V		V
	Profile of primary teachers at the Cigombong District	V			V

Both of the tables above describe the allocation of category and source of data from this theme. The source data (Table 5-4) describes how the node is formed through semi-structured interviews and DMR to support this theme. Most information was

explored in Chapter 4 to precisely expose the location at the Cigombong District (Section 4.2 on page 103), and there is more to be analysed in this section.

The “*Aha*” condition showed a special condition in the Cigombong District, and profile of primary teachers at the Cigombong District was looked from nodes of demography, topography, infrastructure, and teacher profiles at the Cigombong District that supported several nodes. The first is a condition of the Cigombong District, which is part of Bogor Regency, a suburb of Jakarta. Most interviewees stated that the school and home are located in hills and mountains, and based on a conversation of the location where the interviewee lives and school location is supported by the official website from Bogor Regency. For example, Ciadeg Village is a representative of nine villages in the Cigombong district. Most interviewees from Ciadeg Village lived in the vicinity of the school, and the schools are located under the slopes of Salak Mountain. Strong evidence of the participants living near the school was found when this research analysed digitally the participants' biodata form in the LMS, indicating that most of the participants live near the school and only a few teachers live outside the Cigombong District. Thus, the topography condition of the teachers' residence is the same as the school's location, mostly hills and highlands.

Furthermore, most of the interviewees from Ciadeg Village agreed that most public primary schools in Ciadeg Village are not easy to access by car and public transportation, but can be accessed by motorcycle. This situation identifies the infrastructure access at Ciadeg village that assumed an uneven infrastructure at the Cigombong District. Cross-checked data was made between other participants, and various perspectives were expressed from over half of the interviewees who felt that the school was difficult to access by public transportation, and only a small number of interviewees said their homes are easy to access through public transportation. Moreover, the interviewees exposed the latent meaning that most felt the Cigombong District is far from the Bogor Regency city; only a small number said nowadays is better than in the past. This finding is significant proof that the Cigombong District is challenging to access by public transportation and most people. This finding contributed to the Aha condition of the Cigombong District, where nodes were present above, referring to the nodes location and infrastructure of the Cigombong District,

and the researcher immersed the meaning to the Aha Condition at the Cigombong District.

Furthermore, a surprising condition in the Cigombong District indicates that the communication infrastructure was not fully covered by cable networking access and broadband wireless connection. These views were found in statements regarding the internet connection with cable and broadband wireless at the Cigombong District. The data explored in Chapter 4 (Section 4.2 on page 103) showed that the coverage area for broadband wireless connection at the Cigombong District and Cibinong city of Bogor Regency is unbalanced, with various signals of 4G, 3G, while some areas do not have signals compared to Cibinong City of Bogor Regency. Two significant pieces of evidence highlighted this situation. The first is that a minority of interviewees said that their school has a cable internet network, and most interviewees did not have cable internet at home, while only a small number of respondents indicated that they have a cable connection at home. The second is that over half of the interviewees have problems with wireless connection both in the house and school, and the minority of interviewees have problems with wireless connection at home, while less than ten per cent have a problem in school. However, the observation form noted that all the participants have mobile phones to access the internet. Interestingly, most interviewees agreed that a mobile phone is an alternative way to connect with the internet at school and home for the location with un-covered communication infrastructure. Even though over half of the interviewees agreed that the mobile phone connection is slightly hard to connect, only several sim card providers are good, but most interviewees felt that it was more convenient to use the mobile phone to access information and knowledge.

Another node to contribute to this theme is the demography aspect of teachers and a profile of primary teachers at the Cigombong District. This node is part of the subcategory of profile teachers in the Cigombong District. The teacher profile was outlined in Chapter 4 (Section 4.3 on page 111) that over half of the population teachers taught at primary schools, scattered in 50 primary schools surrounding the Cigombong District. For instance, Ciadeg Village has 55 primary teachers scattered in six public schools with 1,370 students within one to two kilometres from each school with names like Ciadeg Primary School 01 until Ciadeg 06 Primary School in one

community, namely 08 Ciadeg TWG. The official website MoEC recorded that most teachers' age at Cigombong is between 20 and 39 years old with a range of ages between 20 and 60 years old, and approximately 60 per cent of the teachers in the Cigombong District are female. There are two types of teacher status at the Cigombong District, namely government servant and contract teacher. Official digital document MoEC records an unexpected condition on this which approximately two-thirds of the total as contract status which majority of contract teachers are paid by the school rather than by local authority (district or province). Even though a contract teacher's qualifications are simpler than the government servant's, there is no different treatment for them to improve knowledge, pedagogical skills, professional approach, and continuing professional development in the Cigombong District. For example, 60 per cent of the teachers who participated in the NTP in the Cigombong District were government teachers, and 40 per cent were contract teachers.

In addition, some issues were identified on this node to support the themes. The first issue is that fewer teachers have professional certificates at the Cigombong District (Kemendikbud, 2017). This certificate shows a teacher's eligibility to teach in Indonesia, and the certificate is produced by the government following a specific requirement, as explained in Chapter 4 (Subsection 4.3.2 on page 112). The official website of MoEC showed that less than half of the teachers at the Cigombong District have a professional teacher's certificate from the government. The participants' digital biography shows that almost 13 out of 20 participants have teaching experience of more than eleven years, and the official website shows that teachers at the Cigombong District have appropriate education levels and experience to teach. The second issue is the demography of location for where the teachers live. Most interviewees were contract teachers living near the school compared to government servant teachers who lived a little far from school but still within the Cigombong District. Thus, there was a phenomenon of recruitment of teachers at the Cigombong District that suggested local authorities recruited teachers by referring to their address rather than other factors. The study showed that the number of contract teachers is higher than government servant teachers due to location.

These nodes indicate challenging conditions at the Cigombong District that brought the *"Aha" condition to Cigombong District*. For instance, the Cigombong District is

mostly hilly with mountains, uneven infrastructure in certain locations with several residences that are hard to access by public transportation and cars, and teachers accessed the school by motorcycle and walking, even though a majority of the teachers lived around the Cigombong District and near the school. Another challenging situation is that the communication infrastructure did not cover all areas by cable broadband and broadband wireless connection with various signals, while some areas had no signal. In addition, the profile of teachers shows that most teachers are contract teachers rather than government status, and over half of them teach in primary schools and are less competent as only some have a professional teaching certificate from the government. However, there is no treatment for them to improve knowledge, pedagogical skills, professional approach, and continuing professional development in the Cigombong District. Thus, all 'Aha' condition brings the challenging situation for teachers to teach, learn and improve their knowledge at the Cigombong District.

5.3.2 Mobile Technology and I are Friends

The second theme focuses on mobile technology action by teachers in a rural area in the Cigombong District. The theme was created after reflecting on what teachers were doing in their daily routine with mobile technology based on the data collection, which explored mobile technology utilisation at the beginning of Chapter 4 (Section 4.4 on page 116). Furthermore, the exploration subsection in Chapter 4 showed two main activities that used mobile phones to support the learning process at the Cigombong District. The first type supports the learning process in class, and the second is learning support for continuous teachers' professional development. Thus, this theme was analysed from Chapter 4 from the theme *mobile phone and I are friends*. This theme explored the latent meaning of mobile phone use.

Furthermore, the theme appears in the challenging situation at the Cigombong District of uneven infrastructure and broadband wireless connection for teachers' daily activities, which is related to the first boundary of the rural conditions at the Cigombong District, in the category of utilisation of mobile technology at the Cigombong District under two sub-subcategories; type of familiar mobile technology, and utilisation of

mobile phones for routine activities and education learning process (Table 5-5). In addition, this theme shows the closer the teachers at the Cigombong District with mobile phones for their daily activities which all nodes brought the theme *mobile phone and I are friends*.

Table 5-5 Supporting nodes for *Mobile Phone and I are Friends*

Category	Sub categories	Nodes	Themes
The utilisation of mobile technology at the Cigombong District	Type of familiar mobile device	Mobile Device	<i>Mobile phone and I are friends</i>
		The rank of capability using mobile phone	
	Utilisation of mobile phone for routine activities and education learning process	Application use	
		Searching	
		Daily activity	
		Source of knowledge for CPD	
		Teaching source and tool	

Table 5-6 Data Source for *Mobile Phone and I are Friends*

Sub categories	Nodes	Source of data			
		Semi-structure Interview	Observation	FGD	DMR
Type of familiar mobile device	Mobile device	V		V	
	The rank of capability using mobile phone	V	V	V	
Utilisation of mobile phone for routine activities and education process	Application use	V		V	
	Searching	V		V	
	Daily activity	V		V	
	Source of knowledge for CPD	V		V	
	Mobile phone as the source and tool to teach in the class.	V		V	

There are two main data collections in this theme. This study used two primary sources for the theme; a personal interview by semi-structured interview with 15 teachers and

six participants in the FGD discussion (Table 5-6). Six of the participants from the FGD discussed for approximately 25 minutes about the daily activity using mobile devices. Furthermore, the researcher started to transcribe the results of the interview and FGD as a preparation step in content analysis. The researcher started to read and re-read transcribed interviews and organised the data by using the original Bahasa to get an understanding of the meaning. The research put all transcriptions on the NVivo software. The researcher used the facilities on NVivo named "word frequency queries". These facilities mostly appear in a discussion in the FGD session. Al-Kindi and Al-Khanjari (2021) argued that word frequency queries can be extremely useful to help us get familiar with our data. The researcher limited the length of words by five-characters and 20 words that most frequently emerge. NVivo generated a list of the most frequently used words to find the 20 most frequently used words. As a result, the mobile phone is the most word that appears during a conversation following the words 'WhatsApp' and 'searching.' Table 5-7 illustrates the most common words used by different participants through their attempt to define Teacher Activity on Mobile Technology. The word "mobile phone" occurred thirteen times, "searching" ten times, "WhatsApp" ten times, "packet data" eight times those are the most frequently occurring words. However, when these words were grouped, the concept of Teacher Activity on mobile technology (including information, application, content, online) occurred most frequently to form a relative definition of the targeted theme. Thus, this facility helps in making node and understanding the meaning that was discussed.

The word frequent queries gives clues. The word frequent queries can help find the meaning of mobile technology activity for teachers at the Cigombong District. Figure 5-1 shows a visualisation picture of the word cloud from FGD by giving a more visual sense of the most frequently used words, which is the same count as the word (Table 5-7) but in the form of a cloud. This visualisation easily enriches us by illustrating major themes. Meanwhile, a deep understanding and specialised expression will form the moderate occurrence words that give a specific definition for each of them. Accumulated words are formed in the cloud formation, with the max font size representing the biggest occurrence of the same word in coding node references. The selected words should have meaning in the frequency process and the words that did not have meaning are deleted. For instance, the word 'WhatsApp' can mean that

Table 5-7 Results of the Most Frequent Words used from the FGD

No	Word	Length	Count	Weighted Percentage
1	Mobile Phone	9	13	3,30%
2	searching	7	10	2,54%
3	whatsapp	8	10	2,54%
4	packet data	7	8	1,02%
5	application	8	7	1,78%
6	information	9	7	1,78%
7	rare	6	7	1,78%
8	content	6	7	1,78%
9	use	5	6	1,52%
10	usually	6	6	1,52%
11	facebook	8	5	1,27%
12	google	6	5	1,27%
13	signal	6	5	1,27%
14	online	6	4	1,02%
15	learning	12	4	1,02%
16	always	6	4	1,02%
17	hard	5	4	1,02%
18	source	6	4	1,02%
19	telegram	8	4	1,02%
20	class	7	3	0,76%

The first sub-category is a type of familiar mobile device for the teachers. The mobile phone is a frequent device that the teachers use for their daily activities compared to laptops and tablets. Besides, not all interviewees have laptops and tablet devices. Most interviewees in the FGD said that the teachers felt more comfortable using the

mobile phone rather than the laptop to search for information, knowledge, and skill. Some interviewees supported this by comparing a mobile phone and a laptop, and felt it is more comfortable to use a mobile phone in a particular condition, such as in class. Almost all the members of the FDG agreed that a mobile phone is like a friend in their daily activity. Even though four out of six members said that signal is the main barrier to mobile internet access, three out of six interviewees in the FGD said their mobile phones always have packet data to connect to mobile internet.

Therefore, mobile phones are convenient and friendly for teachers rather than laptops and tablet devices. Another fact shows that the participants were competent in operating and using a mobile phone. Almost nine out of 15 interviewees said by self-assessment that they are competent in operating a mobile phone. Interestingly, most respondents who were proficient in using a mobile phone were between 32 and 41 years old. This sub-category concluded that the teachers were familiar and frequently used the mobile phone rather than other devices. Therefore, mobile phones are comfortable to use in a particular condition, and the participants are competent in operating the mobile phone. However, there is an obstacle to internet connection on mobile phones, but this did not deter participants from bringing their mobile phones, as the majority always have packet data to connect to the internet.

The second sub-category focuses on mobile phone utilisation for routine activities and the education field. As mentioned earlier in this section, this subcategory was explored in Chapter 4 with a mobile phone utilisation subsection for teachers at the Cigombong District (Section 4.4 on page 116). However, there is latent meaning on this activity that mobile phones are part of the teachers' lives, and that they rely on mobile phones to do their activities. For instance, six members of the FGD used the mobile phones to look for information such as news and general information they need in life. Other activities through the mobile phone is for entertainment, product selling, online shopping, and games—two from six members of the FGD sold products through their WhatsApp. Thus, the mobile phone is not only for communication but also to support daily routine activities, and more than ten out of 15 interviewees said that they reaped the benefits from a mobile phone in their daily routine activities.

Based on the nodes in the NVIVO software, several common applications were installed on their mobile phones, such as WhatsApp, Google, Facebook, YouTube, and Instagram. Most interviewees used WhatsApp to communicate, discuss and share information or knowledge with family members or colleagues. The forum revealed that teachers frequently used social media applications such as Facebook and Instagram. Besides, most members of the FGD used Google to search for information, skills and knowledge to support the class's learning process. All the FGD members agreed that mobile phones support day-to-day activities and act as learning support. Almost 11 out of 15 interviewees said they used mobile phones for both activities.

Therefore, mobile phones are used for daily routine activities and supported daily activities in the education field. Most of the FGD members used mobile phones in the education field. The word "searching" appears to be the most frequently mentioned in the FGD. The researcher conducted a more in-depth FGD to determine the actions taken on 'searching activities on mobile phones'. Most discussions showed that mobile phones were used to look for information and knowledge. Most interviewees searched for activities and general information and knowledge connected to professional teacher and teacher knowledge through Google and YouTube on their mobile phones. In addition, the interviewees and the FGD said that the teachers felt more comfortable using mobile phones rather than laptops to search for information. Besides that, 13 out of 15 interviewees shared their knowledge and information through their mobile phones by WhatsApp or Facebook to other colleagues at school or the community when they could not meet at school or TWG. The teachers searched for knowledge and received information from other colleagues over their mobile phones. Therefore, knowledge and information exchange occurred using mobile phones between teachers in the Cigombong District.

Another node relates to mobile phone activity to support the class's learning process as learning resources and tools. Almost 11 in 15 interviewees thought that mobile phones help teachers in class. Four of six members of the FGD used mobile phones to search, check and find learning material for class. This is in line with the analysis of word frequency in NVivo where the words 'Google' and 'Search' emerged from the FGD with four of the six members of the FGD explicitly saying that they used Google search engine and YouTube to support the content of learning in class. These

activities show that mobile phones are not only for learning resources but also for looking for information and content support for students in the classroom. Some FGD members used their mobile phones to check the teaching content when they doubted their answers to students' questions. Some members of the FGD believed that a mobile phone is more comfortable to use than a laptop in the class to search in unexpected conditions. It seems that the teachers had their mobile phones during the learning session in class. Supporting data shows that eight out of 15 interviewees used mobile phones to help find the learning content for students and support from both in and out of the class.

Together, these results provided important insight into the utilisation of mobile technology at the Cigombong District. The nodes above indicated that mobile phones are user-friendly and comfortable for teachers in a challenging situation in the Cigombong District. Teachers who taught in primary schools in the Cigombong District were more dependent on mobile phones than other devices to support their daily activities, including education field activities. Teachers did numerous activities on the mobile phones such as entertainment, online shopping, online selling, entertainment, games, learning to improve knowledge, and learning for themselves and their students.

Thus, the mobile phone is a friend for teachers that cannot be separated from their lives, and also a 'friend' to support teachers' knowledge of CPD. Knowledge exchange and information between teachers in the Cigombong District occurred when they did not have time to meet face to face in school or the community. Therefore, the mobile phone showed a strong relationship with the teachers' daily activities and teaching process using mobile phones. Most interviewees said that mobile phones helped teachers in the class to search, check, and find learning material. This condition caused the teachers to rely on the mobile phone being always in their hands. The implication of this situation is exposed in the next themes as an activity where teachers used the mobile phone during the NTP and DP to support continuous teacher professional development with knowledge of HOTS as content for CPD of teachers.

5.3.3 All-round Mobile Phone

The third theme is the *all-round mobile phone*. This theme was created after reflecting on what the teachers were doing daily using a mobile phone, as explained in the theme above (Subsection 5.3.2 on page 166). Besides, this theme is a reflection of the teachers' actions at the NTP in the Cigombong District and the DP at 08 Ciadeg TWG, as described in Chapter 4 (Subsection 4.5.2 on page 125), as well as using the mobile phone to facilitate participants during the Dissemination Programme at the 08 Ciadeg TWG (Subsection 4.6.3 on page 147). All of these activities helped this research to discover the theme by encouraging more variable data. Furthermore, this study classifies this theme in the boundary of CPD activities at Cigombong that are divided into two main activities; the NTP at the Cigombong District and the DP at 08 Ciadeg TWG with the category of mobile phone activities during the NTP and DP at 08 Ciadeg TWG (Table 5-8). Three subcategories support the classification, supported by ten nodes (Table 5-9). Table 5-10 provides information about the resources of the fact and data on this research that brings us to conclude the theme *all-round mobile phone*.

Table 5-8 Boundary and Category for *All-Round Mobile Phone*

Boundary	Category	Subcategory	Themes
CPD of teachers at the Cigombong District	Mobile phone activity during the NTP and DP	Mobile phones assist in accessing the LMS	<i>The all-round mobile phone</i>
		Mobile phone as tool device	
		Mobile phone activities during the training session	

Table 5-9 Supporting Codes for *All-Round Mobile Phone*

Category	Subcategories	Nodes	Themes
Mobile phone activity during the NTP and DP	Mobile phone replacing functions of LMS	LMS Activities	<i>The all-round mobile phone</i>
		Device access	
		Frequency access	
	Mobile phone as tool device	Modem device	
		Reader device	
		Taking photo	
		Record	
	Mobile phone activities during the training session	Searching activities	
		Ask activities	
		Sharing activities	

Table 5-10 Data Source for *All-Round Mobile Phone*

Subcategories	Nodes	Source of data			
		Semi-structure Interview	Observation	FGD	DMR
Mobile phone replacing functions of LMS	LMS Activities	V			V
	Device access	V			V
	Frequency access	V			
Mobile phone as tool device	Modem device	V	V		V
	Reader device	V	V		V
	Taking photo	V	V		V
	Record	V	V		V
Mobile phone activities during the training session and dissemination	Searching activities	V	V		V
	Ask activities	V	V		V
	Sharing activities	V	V		V
	Download content	V	V		V
	Distribution content of HOTS	V	V		V

The first subcategory is mobile phones replacing the functions of the LMS. The LMS is part of the NTP system. Hence, the participants could not ignore the LMS as a facility and monitoring system from the government, in which they were tied to the system; however, some of the LMS facilities are flexible to change. The researcher explored the LMS implementation in the NTP at Cigombong in Chapter 4 (Subsection 4.5.3 no page 128) that brings this theme's essence. It is clearly in the implementation of the LMS that the participants faced a challenge in using the LMS. The exploration showed that the participants did not maximise the facilities in the LMS. The LMS notified that there were no activities that used video conference and forum chat through the LMS at the Cigombong District. As one core teacher said:

SGL: "LMS, as long as I monitored, is never used. Maybe they [teachers] do not have enough understanding yet about LMS. Ninety per cent of participants'

discussion was through mobile phones with WhatsApp. Moreover, most participants contacted me through personal WhatsApp or in group chats”.

The core teachers who created the WhatsApp group ‘PSRTA PKP Ciadeg Cigombong’ anticipated this condition the day before starting the NTP. This study believes that WhatsApp was chosen because it was a familiar application for the participants and core teachers based on the fact that this study was found in the theme *Mobile phone and I are friends*.

Conversely, the mobile phone replaces the LMS functions, which the participants used to discuss, communicate, and for knowledge transactions. Through the mobile phone, participants can text, call directly to the core teachers or other peers, and do many things relative to activity on the LMS. In addition, the discussion around the LMS was made in a chat group. The LMS is one of the words often expressed in the conversation in the chat group (Figure 5-2). Most discussions in the chat group about the LMS was about the challenge to access and use the LMS. Five out of 20 participated openly in the WhatsApp group, WhatsApp status and In-training activities that have problems with the LMS, including two core teachers saying the same thing.

to mobile phones to open the LMS when they have a problem accessing it. For example, in one of the sessions with the topic of 'online mentoring class', the teacher must learn to sign in, upload, and download the material of training on the LMS. The participants were unable to connect to the internet on the laptop, therefore, they mostly used their mobile phones and learned from their mobile phones.

Thus, the mobile phone can replace the functions of the LMS. Some functions were replaced by mobile phones, such as communication tools and discussion forums in the LMS. Even though the participants could not ignore the LMS as a facility and monitoring system from the government, the mobile phone helps participants communicate, discuss, share, and get content of the training programme. Furthermore, a mobile phone is a common device to access the LMS where the majority of participants access LMS to sign-in and read and send tasks. Those activities provide a reference to the theme 'all-round mobile phone' in particular to replace some of the functions of the LMS as part of the NTP system.

The second subcategory is a mobile phone as a tool device. This subcategory explores mobile phone activities during the NTP at the Cigombong District, as discussed in Chapter 4 (Subsection 4.5.2 on page 125), and the DP at 08 Ciadeg TWG (Subsection 4.6.3 on page 147). It explains that the participants actively used their mobile phones during the NTP and the DP. Moreover, mobile phones were used to communicate between participants, core teachers, and colleagues at the NTP and DP. Physical actions with mobile phones were done by taking a photo, recording the material, as an internet modem, and as the tool for reading the module during activities. Those explorations are support action in the theme *all-round mobile phones*.

The variant of finding and fact by activities on mobile phones was varied, but this theme explains a mobile phone as a device or a hard device rather than activities within their mobile phone. This research delves into how the mobile phone helps the participant solve unexpected conditions during the NTP and the DP by giving the facts and data that the researcher garnered mostly from the observation form and DMR. For instance, when participants are not connected to the internet on their laptops, the researcher noted that several participants used their mobile phones as a modem device to connect their laptops. The interview result shows that less than half of the

interviewees used a mobile phone to connect the internet to their laptop, as one interviewee explained the reason:

SSC: "I use my mobile phone as a for hotspot or modem for my laptop. It is because it is easy to find connection on the phone and we can choose the cellular company and quota data are more flexible".

Another interviewee supported that:

DL: "When it is activities (IN service), It is clear that my mobile phone use as modem".

The above action demonstrates that teachers used mobile phones to help them connect to the internet on their laptops. DMR noted that several participants used mobile phones as a modem to connect the internet on a laptop, and the observation notes the same action in activities IN-1, IN-2 and IN-3. These actions were probably due to the demography of the Cigombong District being uneven with wireless internet connection. Therefore, the participants showed the initiative to solve the problem by using a mobile phone as a modem.

Furthermore, the digital documents showed surprising activities more than once where some participants used their phones to read a task while working on the laptop simultaneously, i.e. participants used two devices in one action (Figure 5-3).

Figure 5-3 Participants Use a Mobile Phone While They Were Working With a Laptop



The researcher spontaneously asked one of the participants, "why did they do this." She explained:

MR: "I do this to make it easier to find information. Doing tasks on my laptop and viewing content through my mobile phone and I do these stuff activities quite often".

The participants used two devices in one action, taking notes and simultaneously listening to the activities IN-2, IN-3 and IN-4.

The two activities above showed that the mobile phone helps participants solve unexpected conditions during the training session. Over 12 out of 15 interviewees used mobile phones to take photos and video recording during the IN and ON activities. Moreover, nine out of 12 interviewees did this with the purpose of revising after the training session. As one interviewee said:

MR: "For my notes. Sometimes core teachers deliver the material fast, so I took the photo. I plan to share the content of this programme because my friend

want to know the result of this programme but I'm waiting until the end of this programme”.

Other interviewees believe that:

LN: “Yes, I did it for my document. Take photos, and video recording is rare. Mostly chat, and if I don't have a learning unit, sometimes it's sent through WhatsApp. We've got the WhatsApp groups”.

Thus, mobile phone activity is a tool for taking pictures, recording, but also as a modem and reading device for the participants during the training and to solve the problem where they encountered unexpected issues during the training session and dissemination activities.

The third subcategory explores the mobile phone activities rather than mobile phones as devices to support the NTP and the DP. The subcategory of mobile phone activities during the training session and dissemination was supported by five nodes consisting of searching, asking, sharing, downloading, and distributing. Most data were captured from transactions in the WhatsApp group and interview data. These subcategories showed how the exchange of knowledge and transaction refers to the knowledge or information they have through activities of searching, asking, sharing and exchanging the knowledge of HOTS with another peer, and collaboration via mobile phones.

Moreover, the NVivo software helped this study find the subtheme through nodes during the data analysis. The first node in the theme relied on searching activities through mobile phones to look at the information of the content of the NTP. Nine out of 15 interviewees searched using Google, and around a quarter used Google and YouTube to get knowledge and information of HOTS through their phones. As one interviewee expressed:

MR: “I am searching for information about design of HOTS in Google through my mobile phone. I find many people post about it. That is the way I learn and take a sample of design of HOTS”.

The majority of participants actively searched for knowledge through mobile phones. The DMR captured over eight participants openly searching content through mobile phones while discussing or working on the task (Figure 5-4).

Figure 5-4 Participants Used a Mobile Phone While They Were Working On a Laptop



Furthermore, the researcher analysed the topic deeply on the activities in the training session. The participants searched the related information on the program and teacher knowledge of HOTS, such as learning design through HOTS, method and strategy of the HOTS approach, and the program itself:

MR: "I am looking for information about the lesson plan in google. There is a lot of people post about that. So, I look and take sample of the lesson plan".

Another interviewee supported that:

VS: "I am searching an article about this program and HOTS itself such as the HOTS approach to learning method".

The participants have the initiative to search for information about the programme without fully relying on the LMS and using many sources through mobile phones. This activity shows that all participants employed self-learning relative to the training. The core teachers supported that by stating that participants have self-learning and usually search information through channels like Google, YouTube, and Facebook to get additional information. The interview result shows that all interviewees have self-learning to search for information and content related to the program and knowledge of HOTS through mobile phones.

However, activities that search for information at the DP is not as much as activities in the NTP. The facilitator who is a participant at the NTP uses content they got from the NTP. The observation form notes that most content from the facilitator were from previous sources. For example, one conversation chat talked about it.

Table 5-11 Conversation on Chat Group 'PKP KKG 08 & 02

Date & Time	Initials	Conversations
[17/11/19 09.56.33]	NW:	<p><i>Hay y,</i></p> <p><i>Coursework 1A is an activity an observation of learning video, but the previous activity is not watching this video</i></p> <p><i>☑ So, do we send it this video to participants through email.</i></p> <p><i>☑ or participants write it based on their experience and knowledge of GLN and PPK itself.</i></p> <p><i>☑ or we skip this because yesterday there is no instruction to doing this activity</i></p> <p><i>Please any suggestion 😊🙏</i></p>
[17/11/19 09.58.03]	SGI:	<p><i>Give that video personally or sent it to the group to watch together.</i></p>
[17/11/19 09.58.42]	NW:	<p><i>Watch together. Many thanks Sir.</i></p>

[17/11/19 09.58.44]	RGI:	<i>Because the activity is an analysis of learning video, so, it means that they must have this video.</i>
[17/11/19 09.58.57]	NW:	<i>Ok 🙌 😊 Video I sent by email?</i>
[17/11/19 10.07.58]	EM:	<i>🙌 I think it better to watch it together.</i>
[17/11/19 10.09.58]	SGI:	<i>Yes, I think so, and they can discuss together.</i>
[17/11/19 12.03.30]	SC:	<i>If I'm not mistake, yesterday they do only coursework 1B and coursework 3, maybe for coursework 1A can do in next meeting or we can delate in 🤔</i>
[17/11/19 12.08.09]	NW:	<i>Just sent it video, Mam 😊</i>
[17/11/19 12.10.15]	EM:	<i>Which one video it is 😊</i>
[17/11/19 12.15.00]	RGI:	<i>https://www.youtube.com/watch?v=9fmEuaf8wGs</i>
[17/11/19 12.15.21]	RGI:	<i>https://www.youtube.com/watch?v=O4dVMSv0c_g</i>
[17/11/19 12.17.14]	RGI:	<i>This is link video from official rumah belajar/ belajar.kemdikbud.go.id : https://belajar.kemdikbud.go.id/pkp/pola_pemb.html</i>
[17/11/19 12.18.02]	NW:	<i>Thanks 🙌</i>
[17/11/19 12.18.26]	RGI:	<i>Please facilitator to share it in each small working "</i>
[17/11/19 12.24.06]	EM:	<i>Thanks Sir 🙌</i>
[17/11/19 12.30.16]	SC:	<i>Oh ok. I will share it in group pkp gugus ciadeg</i>
[17/11/19 12.37.00]	SC:	<i>Thanks Sir, participants can choose the video for analyse.</i>

[17/11/19 12.44.58]	II:	<i>Many thank</i>
------------------------	-----	-------------------

Thus, the facilitator's source for the first activity was used for the next activities. The participants were motivated to learn this program anytime and anywhere, while doing other activities with their colleagues at school and in the DP at TWG.

The next node talked about an activity to ask through the mobile phone. The mobile phone's primary function is communicating, and participants used this opportunity to ask about the context of the NTP and the DP. The participants used a communications application, which is WhatsApp, to ask their questions by texting or calling. This study categorises two asking activities. The first is asking for tasks and assessments. The second is asking about the program's activity and knowledge of HOTS itself through mobile phones. This conversation was mostly held outside the class or face-to-face activity. The majority of the second category, i.e. asking for knowledge of HOTS and tasks, happened in the NTP, where seven out of 15 interviewees were openly active by asking other members or core teachers through the mobile phone in their personal or group chat. For example, one interviewee said:

II: *"I ask a question to my colleague in one group. For instance, how to complete the course work of assessment work, and what is the content and type of HOTS questions".*

The DMR captured over half of the participants actively asking about tasks and assessments through the WhatsApp group. The DMR analysis captured that participants asked about tasks and assessments that they must sign in almost every week. The second activity mostly asked about the programme itself, where participants used their mobile phones to ask about the place of activities, practice, and time of the programme itself.

Conversely, at the DP, the facilitator asked about the theme activity, strategy, and knowledge of HOTS that they will share rather than the participants' tasks context. Indeed, the researcher did not analyse the questions to the facilitator because it is not focused on this unit activity. The data showed that over five facilitators asked about the theme activity and strategy and ensured HOTS content. The active inquiry was observed in the DP, in which the facilitator used a mobile phone to ask the core

teachers. Thus, the actions of the participants' usage of mobile phones in their activities between the NTP and DP have different purposes, but it was clear that mobile phones were used to ask and clarify the programme itself.

The third node is the 'sharing activity'. The researcher focused on sharing through mobile phones rather than the physical context when delivering the content of HOTS through mobile phones in the NTP at the Cigombong District or DP at the 08 Ciadeg TWG. The content sharing can be seen in the group chat of the NTP or the DP. There is one big group chat in the NTP and seven groups in the DP that the researcher has described in Chapter 4 (Subsection 4.5.2 on page 125 and subsection 4.6.3 on page 147).

The first activity sharing happened in the NTP. The DMR shows that over 842 texts and conversations were recorded from the WhatsApp group chats in the NTP. This study selected and analysed the texts and conversations that were related to the NTP context and eliminated the daily conversations. There were around 518 texts related to the context of the NTP with over 44 links to YouTube videos, documents and PDFs that were shared on WhatsApp and 32 posts of photos and videos related to the knowledge of HOTS and the programme. Nine out of 20 active participants shared general information via the WhatsApp group, and most general information were from the core teachers. The core teachers actively shared knowledge about the programs, tasks and assessments, and the majority of the participants responded by agreeing and yes icons. Even though some participants received personal messages from the core teachers, an observation noted that in the early phase of the program (IN-1), the core teachers downloaded content and delivered it directly on Flash disks to several participants. However, the WhatsApp group messages showed that the core teachers would regularly resend the content regarding the themes and topics to be discussed. In addition, most participants said that they did not modify the content when they shared knowledge or information from the national training to their peers. Nonetheless, most of them commented on or added information to the shared content.

The second activity sharing happened in the DP. The DMR noted seven WhatsApp group chats explored in Chapter 4 (Subsection 4.6.3 on page 147), with over 3,500 texts. The same method was implemented in the NTP, in which the researcher

transcribed, read and reread, and organised the data before analysing the texts. The researcher immersed the data into NVivo by putting codes into nodes. However, the researcher focused on the facilitator rather than looking at the actions of the participants in the DP. As a result, there were 2,671 individual posts during this activity, and the focus was on sharing information and the participants' activity. There were over 109 non-texts such as documents, links, and media that the facilitator and core teachers shared in the seven chat groups. The majority of the items shared were photo activities and HOT content. The facilitators were active in sharing knowledge in small WhatsApp groups and the big chat group, and were more active in asking questions personally to the core teachers.

In general, the theme of *all-round mobile phones* emerged through analysing the facts and field data. This theme implicitly meant that mobile phones were actively used by participants in the NTP at the Cigombong District and the DP at 08 Ciadeg TWG. Three activity sub-categories supported this theme: mobile phone replacing the functions of the LMS, mobile phone as tool device, and mobile phone activities during the NTP and DP supported by ten nodes. All subcategories exposed how mobile phones took part in the NTP and DP.

5.3.4 *WhatsApp Contribution in National Framework.*

The fourth theme explores the findings from the activity on the WhatsApp group chat. The theme manifests meaning for the WhatsApp contribution to support the NTP at the Cigombong District and the DP at 08 Ciadeg TWG. This theme is also related to activities that teachers in the Cigombong District do with their mobile phones and social media platforms as part of continuing their professional development during the NTP and DP (Table 5-12).

Table 5-12 Boundary and Category for *WhatsApp Contribution in National Framework Theme*

Boundary	Category	Subcategory	Theme
CPD activity (National training program framework at the Cigombong District and Disseminate at 08 Ciadeg teacher working group)	Mobile phone activity during the NTP and DP	WhatsApp as informal facilities	<i>WhatsApp contribution in national framework</i>

As described in the analysis section above (Subsection 5.3.3 on page 174), WhatsApp is the central tool for participants to communicate, share, ask, and collaborate during the NTP and DP. Even though there is no specific mandated application to support both programmes, most participants regularly use WhatsApp for their activity in CPD at the Cigombong District. Based on the data, WhatsApp is a common application for the participants in the Cigombong District. This is shown in the word cloud from the FGD participants and discussion results for the FDG in Chapter 4 (Subsection 4.4 on page 116).

Several nodes were analysed to understand this theme (Table 5-12). All the data and information were from a single data source, that is the WhatsApp group which was created by the core teachers and participants. The researcher is a member of the WhatsApp group. The purpose of the analysis of the WhatsApp group is to look at the participants' transactions in using this application, and the habitual act of participants using mobile phones with their own members, and the programme itself. Therefore, this theme is different from the other themes in that it is more specific in exploring participants' actions using mobile phones in a specific activity on CPD in the national framework. WhatsApp is the application that most teachers use to talk to each other during the national framework. The participants used the Indonesian language, therefore, the research transcribed all the data using the original language 'Bahasa' to avoid any misunderstandings in the meaning. The researcher used a comparison diagram and a word frequency query to look at the data visually. The theme that

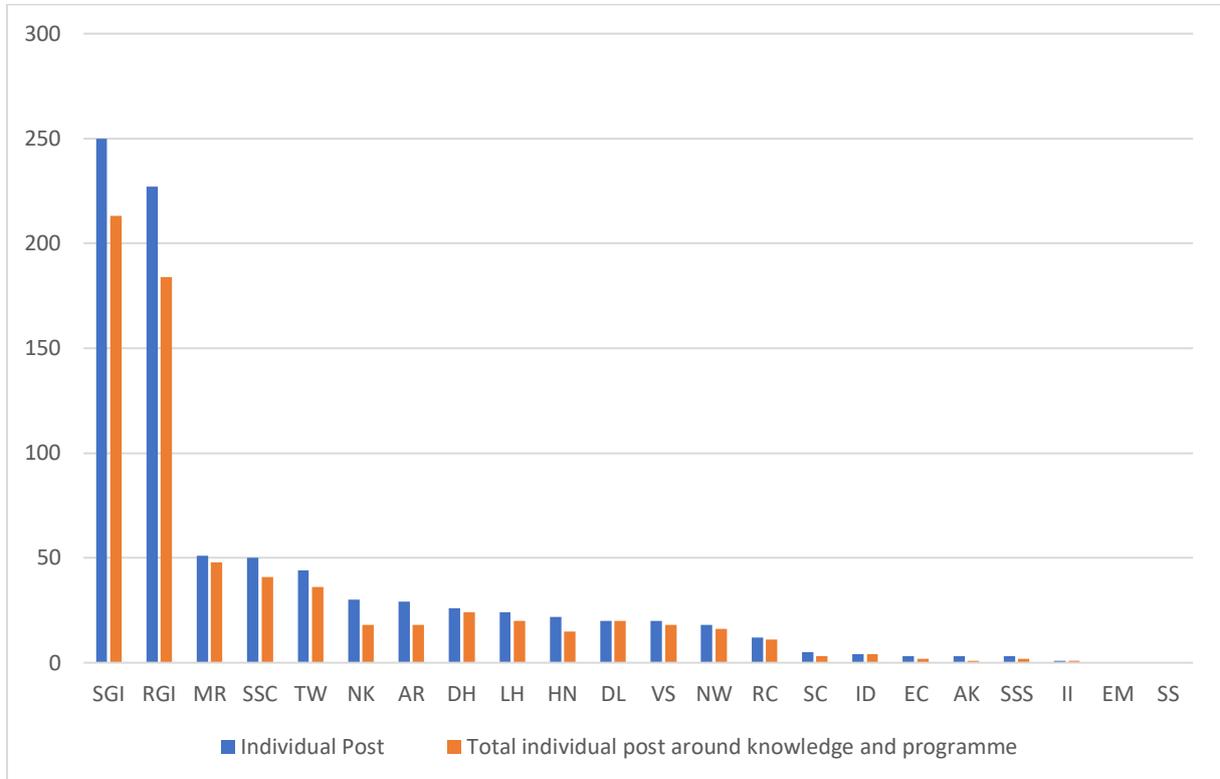
emerged was a comprehensive reflection of WhatsApp activities during the NTP and DP (The table 5-13).

Table 5-13 Supporting Nodes for *WhatsApp Contribution in National Framework* Theme

Category	Subcategories	Nodes	Theme
Mobile phone activity during the NTP and DP	WhatsApp as informal facilities	Chat history	<i>WhatsApp contribution in national framework</i>
		Type of language used	
		The number of group chats created	
		Word frequency used	

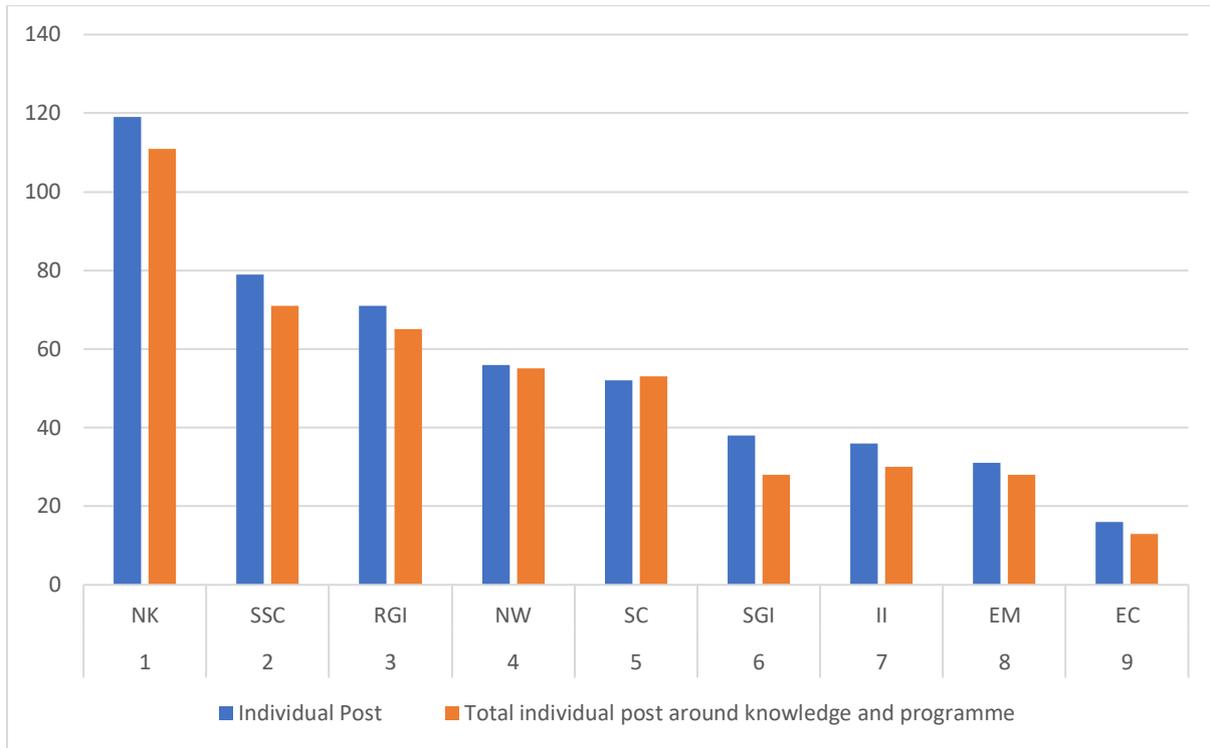
The WhatsApp group chat history was exported as a text file. The text file was manually cleaned and manipulated to be imported as a CSV file to Excel and imported to NVivo for analysis action. There were 3,513 individual posts divided into eight chat groups through WhatsApp. Each post was analysed not as an independent post but a series of activities, such as asking, sharing, discussing, etc., which the researcher exposed to a previous theme that has meaning or connection to the previous post in the chat group. Therefore, the researcher re-read all the conversation chats and deleted some words or sentences from the non-essential topics. The non-essential topics were product selling, jokes, family issues and others. For example, the researcher re-read and eliminated 842 individual chat histories on 'PSRTA PKP Ciadeg Cigombong' in the NTP. As a result, around 695 individual posts (Figure 5-5) were relevant to the programme.

Figure 5-5 Comparison of Figures Between Individual Posts and Posts about Knowledge and Programme in Chat Group 'PSRTA PKP Ciadeg Cigombong'



The same situation existed with the chat history in the DP in the group chat created by the facilitator and core teacher, namely 'PKP KKG 08&02', that all the individual chats were around 498, and around 454 individual posts were connected to the programme and knowledge-based (Figure 5-6).

Figure 5-6 Comparison of Figures Between Individual Posts and Posts about Knowledge and Programme in Chat Group ‘PKP KKG 08&02’



Furthermore, there is a similar pattern in the chat groups. A comparison of the two group chats revealed a similar style of individual posts posted about the programme and the knowledge of HOTS, and posts out of the programme's context, and it happened to other groups. For instance, Figures 5-5 and 5-6 show a gap of chats between individual posts and specific posts about the programme and the knowledge of HOTS. Thus, the participants used the chat room to chat about the programme and the knowledge itself and also chat about other things. This research found that participants chat about family issues, jokes, and daily activities in both group chats in a text format and not text formats such as videos, pictures, or animation. However, the calculation showed that the frequency of out of context chat was less than 20 per cent of the total chat in each group. It seems that the participants understood the purpose of forming the chat group.

In addition, the key person chats the most in the group chats. An in-depth analysis shows (Figure 5-5) that the most texting in the NTP is by the core teachers. They are the key people in the NTP who also maintain the WhatsApp group. Similar to the other groups in the DP (Figure 5-6), SSC and NK have the highest number of texts from the

group facilitators. SSC and NK are the people who presented in front of the class. Nevertheless, not all active members were texting in their group. For example, the number of posts made by each participant in the NTP is shown in Table 5-14.

Table 5-14 Contributions of Individual Posts in Chat Group 'PSRTA PKP Ciadeg Cigombong'

No	Number of Contributions Made	Number of Participants	Percentage of Total Contributions
1	Less than 10	9	3%
2	11 to 20	7	18%
3	21 to 50	4	22%
4	More than 51	2	57%
Total: 633		22	100%

Table 5-14 above shows that most posts (57%) were made by two core teachers, the group's main moderators. The majority of participants (11) made much more posts (over 11 posts), and the rest of them (9) made less than ten or fewer posts, while two of the participants did not comment during the programme. This pattern is similar with the big chat group in the DP, where not all participants post on their chat group.

Furthermore, the chat history was not only seen in each chat group. The members of the chat group actively builds the communication by text and non-text such as media (photo or video format), documents (pdf/ doc/ ppt), and links (YouTube/ Facebook/Website link). There were dozens of media, documents and links sent by the members in one WhatsApp group chat. For example, chat group 'PSRTA PKP CIADEG CIGOMBONG' noted that over 75 media, docs, and links were sent in the group chat in the NTP where 695 individual posts were connected to the knowledge of HOTS and the programme itself (Table 5-15). From this information, the researcher will know what type of information they need to collect, share, and discuss about the actions of the participants. The researcher categorised each dataset through codes that the researcher made and put them in the node to support the existing themes.

Table 5-15 Individual Post in Chat Group 'PSRTA PKP Ciadeg Cigombong' in the NTP

No	Initials	Texting About Knowledge and Programme	Non-texting About Knowledge and Programme		
			Sending Photo/Video	PDF/Doc/PPT	Sending Link YouTube/Facebook/Website
1	SGL	191	3	7	12
2	RGI	169	2	12	1
3	MR	42	5	1	0
4	SSC	40	1	0	0
5	TW	29	7	0	0
6	NK	17	1	0	0
7	AR	18	0	0	0
8	DH	21	1	2	0
9	LH	13	5	0	2
10	HN	12	2	1	0
11	DL	19	1	0	0
12	VS	15	1	2	0
13	NW	14	2	0	0
14	RC	10	0	1	0
15	SC	3	0	0	0
16	ID	4	0	0	0
17	EC	1	0	1	0
18	AK	1	0	0	0
19	SSS	1	1	0	0
20	II	0	0	1	0
21	EM	0	0	0	0
22	SS	0	0	0	0
Total		620	32	28	15

The chat group has a significant activity to support the programme. Table 5-15 shows 695 individual posts in the chat group 'PSRTA PKP Ciadeg Cigombong' that were linked to the programme and knowledge of HOTS from 842 individual posts in that chat group. The same habitual action happened in the chat groups in the DP at 08 Ciadeg TWG. For example, individual posts in the group chat between facilitator and core teacher, namely group chat 'PKP KKG 08&02', where 498 individual posts with 91 per cent individual postings about the programme and knowledge of the program HOTS itself. However, the number of non-texts was not as many as the NTP. The chat group's calculation shows that over 80 per cent of the individual posts in each chat group contain the program and HOTS knowledge. It can be seen from each of the participants' transaction in the DP. Thus, a chat group is a meaningful activity for the participants and supports the programme in both activities.

The second node is the type of language used. The type of words used by members of the chat group is informal communication. The researcher analysed in-depth the way they chatted and responded in the group chat. First is using informal language by using the national language (Bahasa), and sometimes they used the local language (Sundanese language). Secondly, symbols or icons were used to express or respond to other chat members in the group chat. The DMR notes that the most icons used by members of that group chat were 🙌, 🙏, 🤝, 👍, 💪, 😊. Each icon can be interpreted by its meaning. For instance, the icon '💪' is interpreted as 'spirit', and '🤝' is appreciate and '🙏' is ok or agree. In short, what is used in this conversation is very often seen in general because of icons that are familiar here. Of course, its function is to make the words we want to write or say become shorter and have meaning.

Next is the number of group chats on the WhatsApp group. WhatsApp is the most common application for teachers in the Cigombong District, which has been explored in Chapter 4 (Section 4.4 on page 115) and continues to be analysed in the theme of *all-round mobile phone* (Subsection 5.3.3 on page 174), in which WhatsApp is a communication tool for participants during the NTP and DP. Eight WhatsApp group chats were created as part of the two programmes. The first and most important is a chat group in the NTP, named 'PSRTA PKP Ciaded Cigombong' with a total 22 members. This group chat produced 695 individual chats, including text (620 posts) and non-text (75 media, documents and links), connected to the knowledge of HOTS

and the programme itself. The second most important were seven group chats created in the DP at 08 Ciadeg TWG. The name of each group and members were explained in Chapter 4 (Subsection 4.6.3 on page 147). For example, one big group chat, 'PKP Gugus Ciadeg', produced 420 individual posts where the facilitator and core teacher contributed 63 per cent from all conversations or 40 per cent individual posts of facilitator and core teacher connected to knowledge exchange of HOTS and the programme itself.

Table 5-16 Individual Post in Chat Group 'PKP Gugus Ciadeg'

No	Initial	Individual Post	Individual Post About Knowledge and Programme
1	SSC	61	37
2	EC	8	6
3	II	4	4
4	NW	12	12
5	NK	70	39
6	EM	30	17
7	SC	5	4
8	SGL	29	17
9	RGI	47	24
Total		266	160
Total participant post		420	

A new strategy was implemented in the DP at 08 Ciadeg TWG through a chat group. Besides one big chat group that was created, the facilitator and core teachers created five small working chat groups led by two or three facilitators on duty to mentor and motivate participants through WhatsApp. These small groups aimed to maintain members of the DP to get knowledge of HOTS outside of the IN and ON sessions. Facilitators who finished the NTP, exchanged knowledge with members of the DP by giving samples of a lesson plan, learning design, and learning unit based on the facilitator's knowledge, to assist the task or assignment of members in that activity.

Thus, there is a pattern that the facilitator contributed more to a small working chat group and intensive conversation on WhatsApp, as shown in Figure 5-7.

Figure 5-7 Distribution of Individual Posts from Facilitators on Small Working Chat Group in Dissemination Programme at 08 Ciadeg TWG

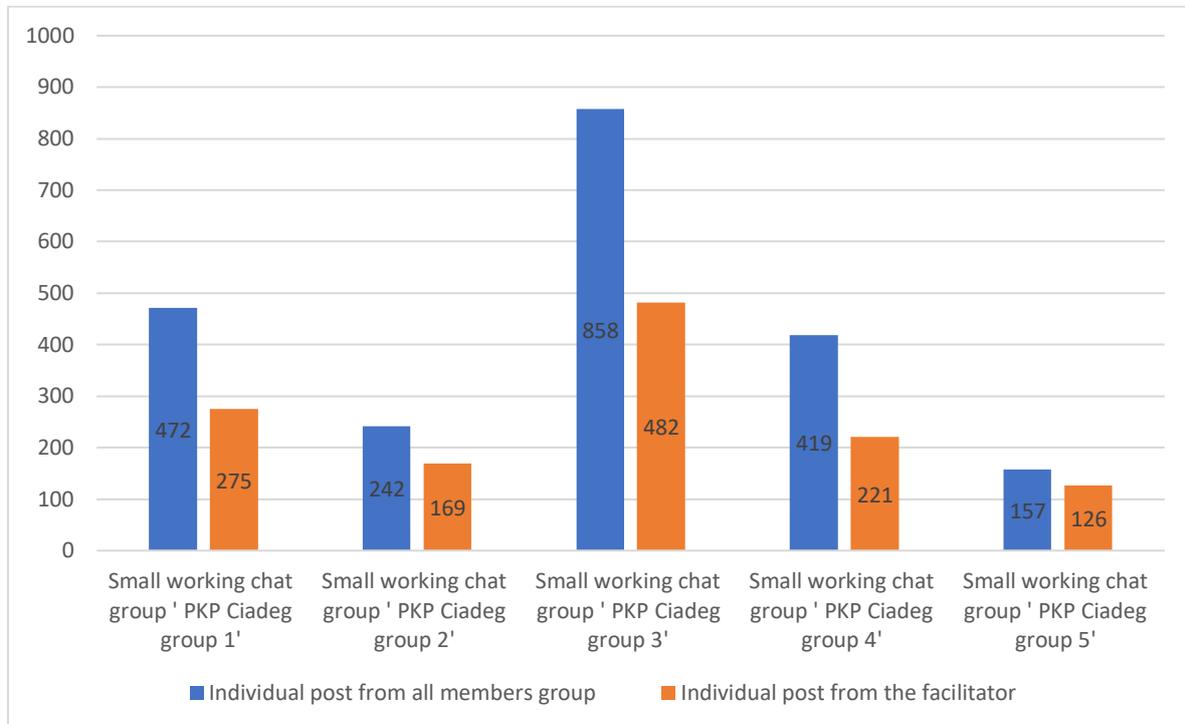


Figure 5-7 above describes that each facilitator in charge produced over half of the posts in each small working group chat. For example, the small working group chat group number two, led by II and NK, have 242 individual posts with 70 per cent individual posts from both of them. II and NK were the key people to maintain the WhatsApp group and the interesting finding is that their group posts focused on the content or context of learning and less on the context and programme.

The third node is the most frequently used word. This node supported the theme above by exploring what the most used word in each group chat is. It helps this research to understand the points they are working for. To give more real meaning to the word, several steps were taken by the researcher. The first step was eliminating non-essential topics in each group chat. Second, Nvivo was used as a query tool to assist the analysis of the most frequently emerging words. NViVo allows the researcher to delete words or letters that are not desired for the concept of the programme and the

'lesson plan', and 'self-evaluation' were the most frequent words. These words are linked to the knowledge of HOTS or the learning content in the NTP. The word 'coursework' is connected to the tasks of participants that they must do every week. In addition, the word 'Ciadeg,' 'participants', and 'peer' can be connected to the place of activity of the program itself.

Furthermore, the most frequent words were analysed in the DP at the 08 Ciadeg TWG. There were seven group chats in this activity. The first group is the chat group 'PKP 08&02'; the group members were a facilitator who had finished the NTP and core teachers with nine members. This group produced 458 individual posts connected to the programme and activities, including 18 media, links, and documents through WhatsApp. The analysis was similar; the researcher eliminated non-essential chat on this group. Thus, the result shows that the frequent words emerged in this group were around 'group,' 'participants', 'Ciadeg', 'ready', and 'facilitators' (Figure 5-9).

Figure 5-9 Word Cloud for Chat Group 'PKP 08&02'

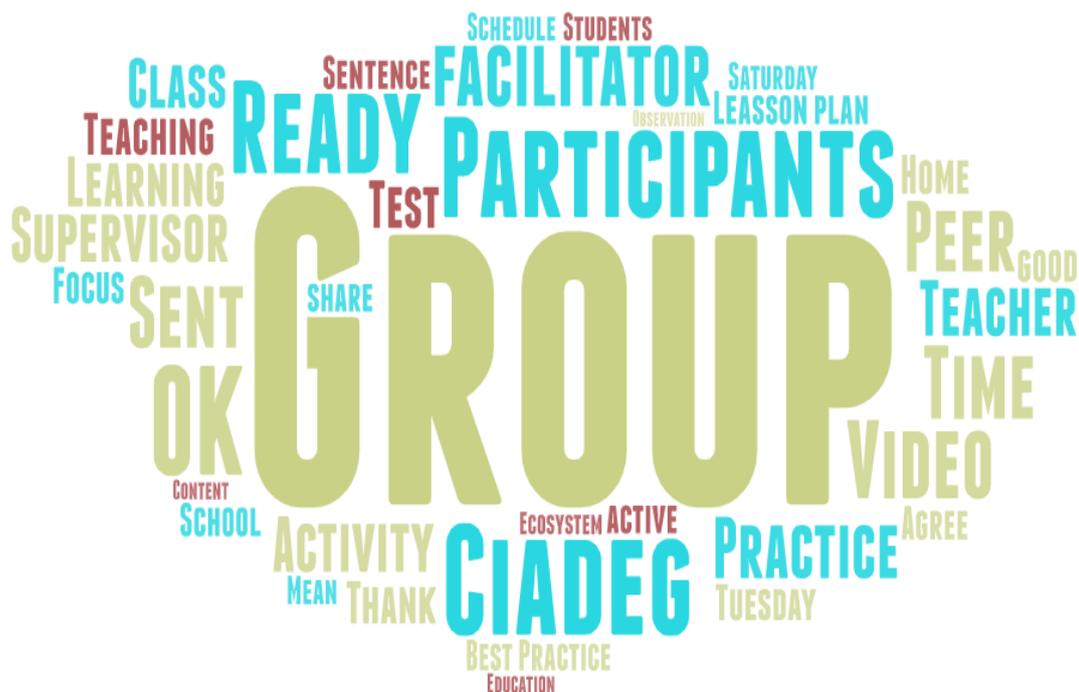


Figure 5-9 shows that the posts mostly discussed information about the activity of the participants on the DP rather than knowledge exchange. It can be seen from the words that they most post, which are 'group', 'participants', and 'Ciadeg' as a place of activity

Figure 5-11 Word Cloud for Small Working Chat Group 'PKP Ciadeg Group Two'

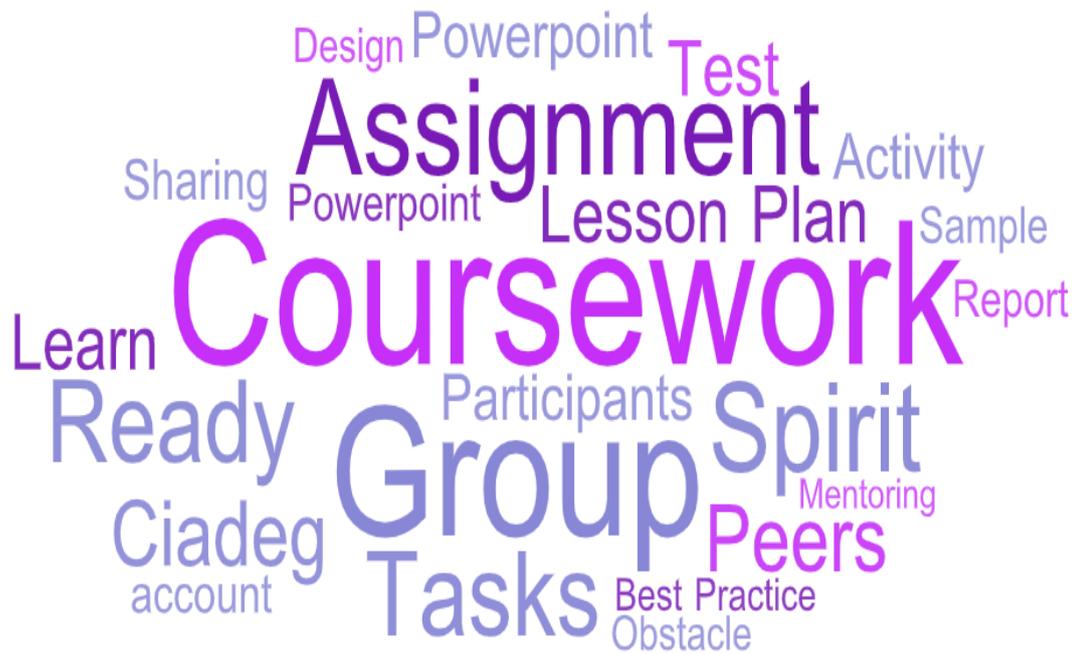
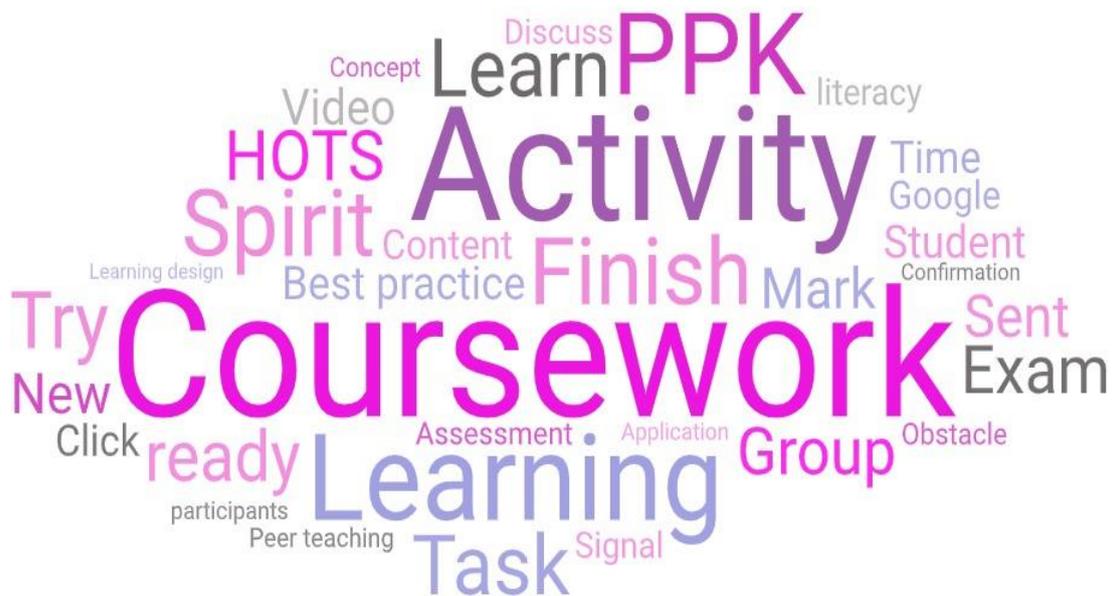


Figure 5-12 Word Cloud for Small Working Chat Group 'PKP Ciadeg Group Three'



The six groups on the DP showed a lot of similarities in the frequency of words posted. They posted the words 'coursework', 'spirit', and 'tasks'. The analysis was continued with the chat group on the NTP (Figure 5-8 on page 196). A comparison of the NTP and DP chat groups revealed the word 'coursework', 'Ciadeg', and 'activity' always emerged in both of them. Thus, there is an individual similarity of posts between the NTP and DP where the posts were mostly about the knowledge of HOTS and talked about the participant's actions in the programme. Only one group was more likely to talk about the preparation of the programme, which is the group with facilitators and core teachers or Chat Group 'PKP 08&02' (Figure 5-9 on page 197). Hence, these nodes show how the group chats involved the participants and activities in the programme.

In general, WhatsApp proved to be an informal supplement to support the NTP at the Cigombong District and the DP at 08 Ciadeg TWG and has an implicit meaning from the participants' activities in the chat group. There are four supported nodes that emerged in this theme. The first is chat history which are the participants' posts that were not always about the programme itself, but also other activities in and out of the programme. The second is the type of language used by the participants. They used informal language switching between national and local language to post their contributions. The third is the number of chat groups created on WhatsApp. Eight chat groups were created in the NTP and DP. The last node is the word frequency used in the chat groups during the programmes. The words 'coursework', 'Ciadeg', and 'activity' were frequently used in the chat groups.

5.3.5 Surface Learning

The fifth theme is *surface learning*. This theme focuses on the mobile phones' role in assisting the emerging surface knowledge of participants on HOTS knowledge. Surface knowledge emerged during the activities in the NTP at the Cigombong District. The theme was created after reflecting on the exploration of participants' knowledge during the NTP (Chapter 4, section 4.5 on page 121); in particular, on the analysis of the training results in the NTP, as explored in Chapter 4 (Subsection 4.5.4 on page 135), and habitual action where the participants utilised mobile phones during the NTP in Chapter 4 (subsection 4.5.2 on page 125). In addition, this theme is part of the

category of teacher knowledge on HOTS (Table 5-17), which was supported by four nodes consisting of early knowledge, routine activity, visual action, and training result.

Table 5-17 Boundary and Category for *Surface Learning* Theme

Boundary	Category	Subcategory	Themes
CPD activity (National Training Program at the Cigombong District and Dissemination Program at 08 Ciadeg TWG)	Teacher knowledge	Surface learning	<i>Surface learning</i>

Furthermore, various data supported this theme (Table 5-18), such as semi-structured interviews, DMR and observation forms.

Table 5-18 Data Source for *Surface Learning* Theme

Subcategories	Nodes	Source of Data			
		Semi-structured Interview	Observation	FGD	DMR
Surface learning	Early knowledge	V		V	V
	Routine activity	V	V		V
	Visual action	V	V		V
	Training result				V

The first node is 'early knowledge', which identifies the participants' knowledge about the HOTS approach before the NTP. The data shows that the participants have basic knowledge of the concept in the early stage of the programme. The researcher asked the participants through an interview if they knew about the program and the concept of HOTS before the training started. The data interview recorded that 11 out of 15 knew about the HOTS concept, and only a small number of interviewees did not know

about the HOTS concept. The majority of the interviewees were aware of the HOTS concept that originated in the TWG activity. The majority of participants knew only about the HOTS concept but did not practice the knowledge of HOTS in class. As one interviewee noted:

SSC: "All I know is the theory. Actually, we haven't practised and just heard in school yet".

Additional information was noted by one interviewee who said:

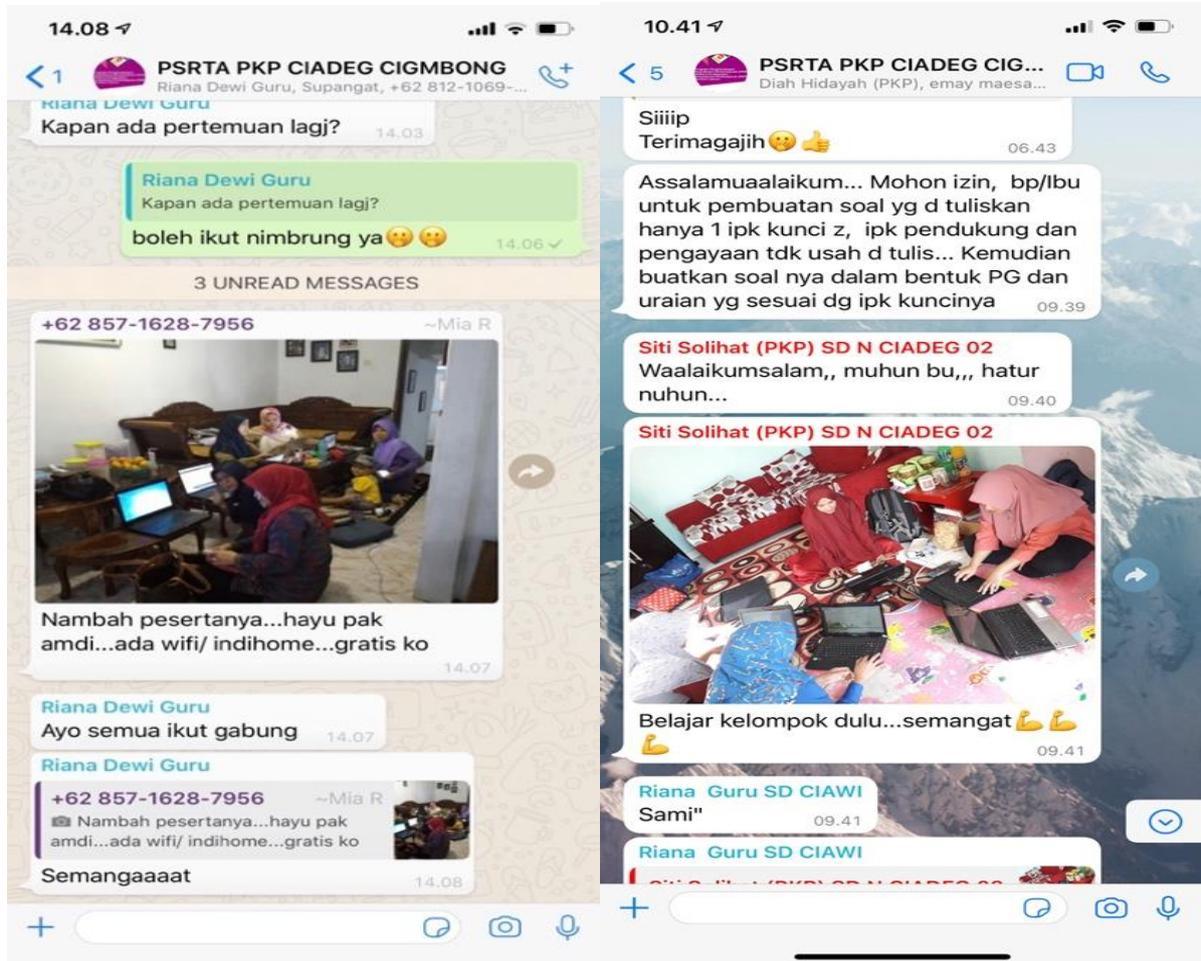
DL: "The information is much less than that. It was discussed in previous activities in the teacher working group, but I didn't really understand how the HOTS approach was".

In addition, ten out of 15 interviewees searched for information about the NTP before the training started. The majority of them searched and asked their peers through mobile phones to find information about this programme. This statement matched the expressions in the earlier statement of FGD members that most FGD members searched for information to support their teacher knowledge by mobile phone. Those statements supported other actions indicated in the observation form and DMR where mobile phones are always seen almost all the time during training. Moreover, these pieces of information matched those from the FGD members who believed that they utilised the mobile phones to share information when they do not have the opportunity to meet and chat directly (face to face). It seems like there is the action of participants utilising a mobile phone to assist in emerging the participants' early knowledge of the NTP.

The next node is routine action to drive the surface knowledge of participants. There are routine actions by the core teachers and participants out of the IN-session activity captured in the data analysis. The first is a working group activity that occurred routinely in the IN session. The DMR showed that the participants made a working group in one of the participants' houses (Figure 5-17). This can be seen from the conversation on the WhatsApp group chat. However, the researcher was not focused on the activities in the IN and ON sessions, as the research focused on the participants' transactions in utilising mobile phones for teacher knowledge in the NTP

during the IN or ON sessions. Thus, the activity in the working group was not captured, but the participants' chat had been captured on the WhatsApp group chat.

Figure 5-17 Activity of Working Group at Home



The second is to routinely deliver similar content as the LMS through the mobile phones. This activity was monitored on a chat group in WhatsApp. Strong evidence of similar content knowledge was found when the researcher compared the material subject on the WhatsApp group chat and in the LMS. The data showed that most of the content delivered on the WhatsApp group chat originated from the LMS. In addition, the DMR analysis showed that over twenty times, the core teachers sent link for videos and PDF material about HOTS (Table 5-15, on page 193). It seems likely that the core teachers bombarded the content and knowledge of HOTS through the chat groups. The most interesting finding was that there were several times where the core teachers sent the same content repeatedly at different times. All of those actions can mean those core teachers wanted to trigger the surface knowledge of HOTS

Although the core teachers routinely delivered the content in the WhatsApp group chat, some of the individuals actively shared the content knowledge of HOTS in the WhatsApp group through their mobile phones. The analysis showed that five out of 20 participants openly shared the knowledge of HOTS through mobile phones. What is surprising is that the activity above helped the participants to re-learn easily by accessing their mobile phones to face the NTP exam. One interviewee said that:

NW: "Of course, It is almost a few weeks had passed. I read and re-read from the beginning of the training activity including the post-test questions given by core teachers on mobile phones. I also read on my cell phone, which is convenient for me".

In addition, the data routinely captured by the analysis was that the core teacher routinely motivated participants to do extraordinary work on this training. Over four times during the NTP, the core teacher motivated and encouraged participants to be active and complete their tasks.

The third node is 'visual action' in terms of understanding HOTS knowledge. Several activities on the NTP must be reported on the LMS, such as making lesson plans, assessing, and evaluating the implementation of the HOTS approach in the class. The participants practised the HOTS approach twice with two subjects (math and science subjects) and submitted it to the LMS. However, some of the participants sent it to the WhatsApp group chat as a visual action for the understanding of HOTS. The participants used their mobile phones to show their knowledge. The analysis shows that four out of 20 participants posted texts, photos, videos, and word files in the WhatsApp group chat, and some of the participants published that on their personal WhatsApp status. This visual action of understanding got a reaction from other participants and core teachers by giving the participants comments and emojis. In addition, an observation noted that four out of 20 participants presented the best practice report in class for the IN activity 5 with good responses from other participants in the class and WhatsApp group. Therefore, the visual action in this node is showing their knowledge and reaction on the mobile phone rather than knowledge exchange in teaching each other in their group session.

The last node is the training result. This node is part of the surface knowledge of the participants who utilised mobile phones. This node refers to the assessment from the NTP that was explored in Chapter 4 (Subsection 4.5.4 on page 135) and participants' activities on the WhatsApp group chat mentioned in the previous theme (Subsection 5.3.4 on page 186). The assumption is that there is a strong action between participants' knowledge and their use of mobile phones to trigger the surface knowledge of HOTS. The action between mobile phones and training results is interesting because participants who failed the assessment from the NTP were participants who engaged less on the WhatsApp group chat. This assumption can be seen from the 30 per cent of participants who did not pass the programme (Table 4-3 on page 138), and nine participants who engaged less by texting in the WhatsApp group chat (Table 5-14 on page 192). The data showed that five out of six participants who failed in the NTP were from the nine participants who engaged less on the WhatsApp group chat (Table 5-19).

Table 5-19 Comparison Between the NTP Result and Number Of Active Participants on WhatsApp Group Chat in the NTP

No	Initials	The NTP result	The number of those frequently texting, sending emojis, videos, PDF, YouTube links, etc. during the NTP in the WhatsApp group chat
1.	RC	Not Pass	11
2.	SC	Not Pass	3
3.	ID	Pass	4
4.	EC	Not Pass	2
5.	AK	Pass	1

6.	SSS	Pass	2
7.	II	Pass	1
8.	EM	Not Pass	0
9.	SS	Not Pass	0

Thus, this is an intriguing action between participants who were active in the chat groups with the knowledge of HOTS that they acquired, and therefore, achieved success in this programme, is correlated between the activities using mobile phones with obtaining knowledge in particular to emerge the surface knowledge of participants. Even though some of the interviewees said contradictory actions, they were not seriously studying to face the exam. As one interviewee said:

AR: "That's the problem, sometimes we are constrained by other assignments and tasks, sir, we rarely open up the material".

Nevertheless, other supporting evidence showed that over half of the interviewees frequently accessed the training materials after the training, and most of them studied on their mobile phones. The DMR notes that over four times, the participants and core teachers shared content through the WhatsApp group by mobile phone to face the exam. One interviewee supported that:

NW: "Of course, It is almost a few weeks had passed. I read and re-read from the beginning of the training activity including the post-test questions given by core teachers on mobile phones. I also read on my mobile phone, which is convenient for me".

Another action in supporting the training results by utilising mobile phones in the NTP was explored in Chapter Four (Subsection 4.5.2 on page 125) and the theme *all-round mobile phone* emerged (Subsection 5.3.3 on page 174). The action of the participants on both of these actions had triggered their surface knowledge of HOTS. The interview results showed that nine out of 15 interviewees started to implement the HOTS approach in the classroom, where half of them got help from the internet through

mobile phones to find the content. The more surprising action is they did this with the confidence of knowledge to implement in the class. Six out of 15 interviewees did not feel confident to implement HOTS materials in the class after the training, and over half of the interviewees only shared content without any modification to other colleagues. Even though the extra effort of the participants and core teachers did not mean good results in the NTP, the training result is one indication that there is an emergence of surface knowledge among participants in the knowledge of HOTS, in which mobile phones contributed to the surface knowledge of participants.

To summarise, the theme *surface knowledge* was from four supporting nodes. The nodes showed that the participants have surface knowledge of the content and the program itself, where the mobile phone assisted in developing the teacher's knowledge as surface knowledge. Therefore, the use of a mobile phone is a significant factor in developing this surface knowledge. There are several possible explanations for this result. The first is that there is early knowledge of participants about HOTS and the programme itself, where the majority of participants searched and looked for information through their mobile phones to find that knowledge. The second is that there is routine action to drive the surface knowledge of participants through mobile phones. This routine is by sending similar content and knowledge to the LMS content and reposting the same content at different times in the way that the participants and core teachers did with the teacher knowledge of HOTS. The third is the 'visual action' in terms of understanding HOTS knowledge through mobile phones that the participants shared through the mobile phones. Last but not least, the action between utilising mobile phones and training results in which participants with surface knowledge failed in the NTP assessment indicated that they were less engaged in the WhatsApp group chat. Therefore, the participants' belief of value knowledge of HOTS is not pervasive to their body of soul, which means there is no confidence to implement after training and no modification to the content shared with other colleagues. These reports show that participants' knowledge is at the surface level and needs to be improved in the next steps. Thus, the researcher explored the participants' beliefs through the next theme and other boundaries.

5.3.6 Deep Learning

The sixth theme is *deep learning*. This theme focuses on the emerging deep learning of participants where mobile phones have an essential role in deepening the HOTS knowledge. This theme is in response to participants' beliefs in the value knowledge of HOTS, where the previous theme showed that they had surface knowledge in the NTP. There is no pervasive knowledge in the participants' spirit, which is reflected by the participants' lack of confidence to implement knowledge of HOTS after the NTP. Apart from that, another indication that could be included is there was no modification of content or comments on the knowledge when shared with other colleagues. Therefore, the next analysis examined teachers' knowledge through seven teachers who completed the NTP and how they disseminated their knowledge to their colleagues at 08 Ciadage TWG as part of the knowledge exchange. These participants were known as the facilitators.

Furthermore, this theme was created after reflecting on the facilitators' knowledge during the DP (Chapter 4, subsection 4.6.2 section on page 143) and the habitual action of facilitators utilising mobile phones during the DP in Chapter 4 (Subsection 4.6.3 on page 147). Besides, this theme emerged as part of the continuing teachers' professional development activity at the Cigombong District, which was put under teacher knowledge with a sub-category of Deep Learning (Table 5-20).

Table 5-20 Boundary and Category for *Deep Learning* Theme

Boundary	Category	Sub-category	Themes
CPD activity (National training program framework at the Cigombond District and Dissemination Programme at 08 Ciadeg teacher working group)	Teacher knowledge	Deep learning	<i>Deep learning</i>

Additionally, this theme was supported by three nodes consisting of belief, moral value, and visible action (Table 5-21). The researcher explored the nodes that

emerged by analysing the actions and understanding from the facilitators as a deep learning process in the knowledge of HOTS through mobile phones. Various data supported each code and node, such as the semi-structured interviews, DMR and observation forms. For instance, the first node is the belief of participants, supported by data from the semi-structured interviews and DMR. The majority of the data was revealed from activities in the DP at the 08 Ciadeg TWG, which focused on seven facilitators who had completed the NTP. However, the knowledge and actions of the participants in DP were not the main points in this study. Nevertheless, the transaction of knowledge between facilitator and participants through the mobile phone was analysed in this study. Therefore, this theme emerged from deep thinking about the facilitator's use of mobile phones to develop their deep learning.

Table 5-21 Data Source for *Deep Learning* Theme

Subcategories	Nodes	Source of Data			
		Semi-structure Interview	Observation	FGD	DMR
Deep learning	Beliefs	V			V
	Moral value	V	V		V
	Visible action	V			V

The first node is beliefs. The previous theme concluded that the facilitators had surface learning after completing the NTP. Nevertheless, deep learning emerged when the facilitators started implementing their knowledge in class and exchanging knowledge through the DP at 08 Ciadeg TWG by mobile phone and meeting activities. Those activities formed the facilitators' belief in HOTS knowledge. A variety of evidence supports these nodes. There is a routine in implementing the HOTS approach by facilitators. Five out of seven facilitators who were interviewed started to routinely implement the HOTS approach in class. However, most respondents in this item felt that they did not fully apply the HOTS approach in class due to slightly improved knowledge, inadequate facilities, and different students' characters at the Cigombong District. As one interviewee said:

II: *“Self Confidence is not 100%. Before, maybe I didn't understand everything even though I got it at the TWG, but after PKP gradually my knowledge and skill improvement”.*

The interviewee talked based on their perception rather than the fact that three out of seven facilitators who were interviewed did not get a certificate in the NTP. It seems that there was a significant positive action between the routine implementation of the HOTS approach and their beliefs of HOTS implemented in class and shared with their peers.

Furthermore, the participants' beliefs were formed from disseminating their knowledge of HOTS in the 08 Ciadeg TWG. These activities were shown in the mentoring sessions and through the mobile phones. The DMR noted that the facilitators used the WhatsApp application for communication and transferred the material and information through this application. The communication about the knowledge of HOTS was texted between the facilitators and participants, and facilitators and core teachers. The DMR showed that the facilitators created seven group chats consisting of five small WhatsApp groups with six or seven members, including two or three facilitators, one small WhatsApp group with seven facilitators and two core teachers to support this activity, and a large WhatsApp group with 29 members consisting of the participants, facilitators, core teachers, and school supervisor. The exploration of these activities was detailed in Chapter 4 (Subsection 4.6.3 on page 147).

In addition, the facilitators' beliefs were supported by the headteachers. All facilitators who were interviewed said they got support from their headteacher to implement and share with other members in class. Even though the facilitators did not believe their knowledge had developed 100 per cent after the NTP, they felt that surface learning happened due to the headteacher's trust, as well as facilitator's knowledge in teacher and knowledge exchanges after the NTP. Moreover, their beliefs were shown by joining the DP for knowledge exchange. Facilitators who responded to this activity agreed to disseminate their knowledge to other members in the 08 Ciadeg TWG for knowledge exchange by taking a similar pattern and system in the NTP. Therefore, the activity of the DP 08 Ciadeg TWG is part of the belief to develop knowledge for a facilitator by routine activity to improve their knowledge. The findings of the DP

demonstrated that the facilitators were more confident after they assisted members of the DP to learn and teach this approach. Most interviews from these seven facilitators showed that they gained a better understanding after they mentored their colleagues in this programme. As one interviewee said:

EM: “Yes, there is progress in my understanding of the content HOTS from the previous activities which I in-depth understanding through this activity. So, I got more knowledge”.

This was also supported by another interviewee:

NK: “Sure, thus I double re-learn now. The national training program 1x, and this dissemination I learn 2x times. I in-dept learn. More knowledge and new information that I got from core teachers and another speaker”.

The conversation above shows that the facilitators increased their knowledge after learning HOTS twice through repetitive knowledge with a series of activities by sharing, discussing, and distributing knowledge, not only face to face but also through mobile phones. The activity of the facilitators in utilising mobile phones in the DP was explored in a previous theme, 'all-round mobile phone' (Subsection 5.3.3 on page 174). Furthermore, the facilitators' beliefs were demonstrated when they mentored participants and kept in touch through mobile phones, specifically the WhatsApp group chat. The majority of the conversation on the WhatsApp group chat discussed the theme activity, strategy, and content context that they would be sharing, rather than the participants' task context or knowledge of HOTS. This action was seen by analysing the combination of word clouds from each chat group 'PKP Ciadeg number 1 until 5' and finding that the word 'coursework' was most frequently used in the chat group. The word 'coursework' itself referred to HOTS knowledge from the coursework learning design until the best teaching practice through the HOTS approach. Thus, the facilitator routinely mentored and implemented the HOTS approach by mentoring their members in small working groups. It seems that the facilitators were more confident when they guided and communicated through mobile phones as can be seen from the interview results and chat transcripts on the WhatsApp group chats. This action brings pervasive knowledge for facilitators as new knowledge was added through their beliefs.

The second node is moral value. This node is part of the deep knowledge element that emerged from the 08 Ciadeg TWG. The mobile phone helps to surface the moral value of the facilitators. Moral values were shown through mobile phones when the facilitator actively texted to encourage and motivate participants to do their tasks and assessment. The analysis of the word clouds from five small working group chats showed that the frequency of the word 'spirit' as a representative of motivation frequently appeared in each group (Figure 5-15 on page 201).

Besides that, the facilitators responded to questions and asked questions in the WhatsApp group chat. This action was captured by the mobile phone, where the facilitator's texting was dominant in the WhatsApp group. This action can be referred to in Figure 5-7 (on page 195) about the distribution of individual posts from the facilitators in a small working chat group in the DP in the 08 Ciadeg TWG. Furthermore, the moral value was shown in the cooperation and collaboration between the core teachers, facilitators and participants in knowledge exchanges (Figure 5-19) during the collaboration of IN and ON activities or out of class and through the mobile phone. As one interviewee said:

EC: "Yes, often collaborate. Sometimes, they come to my house to upload and made the best practice report that I organise together, but they must be calling me first. But some meeting held in participants house that I facilitated that meeting".

Figure 5-19 Collaboration of Facilitator and Participants in an Out of Session in the DP



In addition, there was a collaboration with the facilitator and core teachers to discuss strategy and task delegation to deliver the right content and context. The DMR notes that more than three times, the facilitators and core teachers discussed DP activities through the chat group 'PKP 08&02'. As a result, over 21 images with similar behaviour were posted in six chat groups. This responsibility of developing moral value among the facilitators as they responded to the curious participants on HOTS occurred as the participants trusted the facilitators. Thus, trust was reflected as a moral value among the facilitators. Overall, the activities above can affect the development of deep knowledge.

The third node is visible action, which can be a means of showing the capability of the facilitators' knowledge. Two facilitators presented their knowledge during the DP. The rest of them mentored in a small group activity during IN and ON sessions, including a small WhatsApp group chat. The DMR showed that the facilitators were always beside their members when classes were on, as shown in Figure 5-19 where the facilitator attended the workgroup with one of their members. Mobile phones bridged the visible action of the facilitators by showing their activities and knowledge on the chat groups or WhatsApp status for knowledge exchange and showed their beliefs in

their knowledge. The DMR notes that the majority of facilitators actively shared content, tasks, and photos, including videos relative to their knowledge of HOTS through mobile phones. Even though most facilitators said that they did not modify content from the NTP to their members during mentoring, most facilitators commented or added information to the content. In addition, the facilitator actively mentored participants at the IN and ON sessions and activities through mobile phones by asking and motivating the participants to do their tasks in a chat group or personally. For example, Figure 5-19 showed that facilitators mentored participants in one of the participant's home to learn together and do the task of HOTS. It shows from the lightest frequency of individual post facilitators in small group chats. Therefore, those activities helped facilitators gain confidence and in-depth knowledge of the content. Strong evidence of visible action was found when the interview results showed that almost all the interviewees felt more confident teaching with the HOTS approach after joining the DP as facilitators. Some interviewees said they improved some parts of the HOTS approach, such as lesson plans and learning design. In general, the activity conducted on mobile phones triggered the deep learning of facilitators on HOTS knowledge.

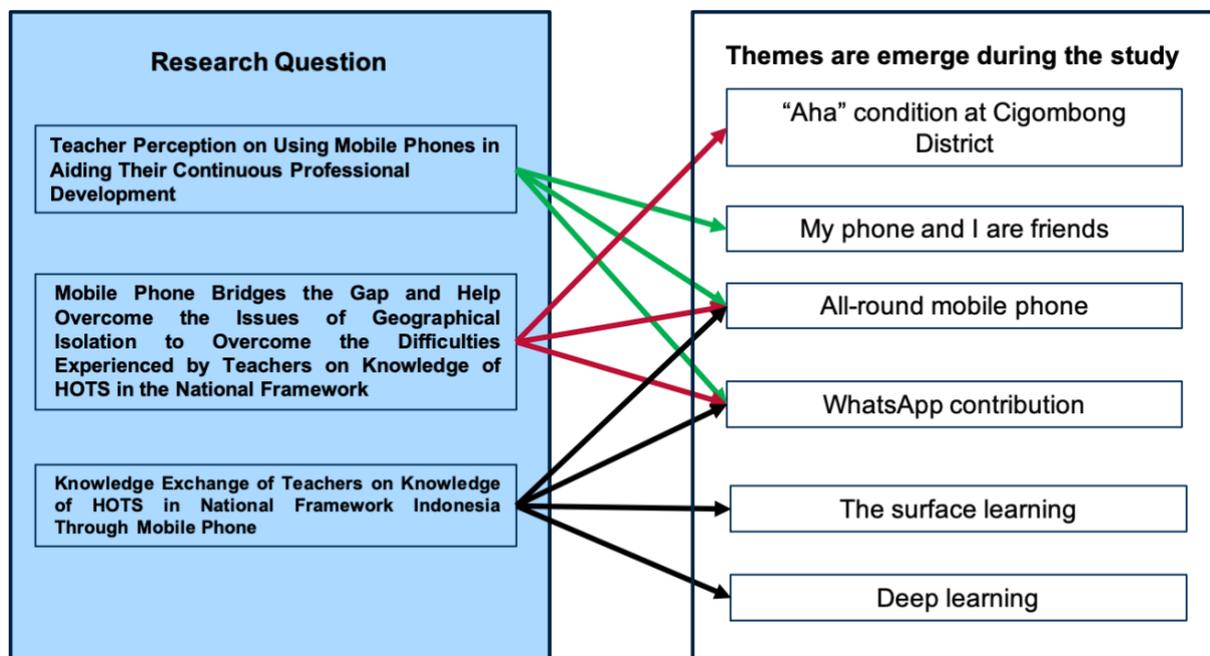
To summarise, the theme of deep learning was supported by three nodes: beliefs, moral value, and visible activity. These nodes' activities were shown through the mobile phone when the facilitators assisted the members of the DP to learn and teach the HOTS approach, as shown by text in the chat group and physical action. The belief of the participants' knowledge was developed when the facilitators agreed to disseminate in the 08 Ciadeg TWG. Furthermore, moral value was shown by facilitators in the collaboration and cooperation to share in the DP between core teachers, facilitators, and participants. The collaboration and cooperation were not only in class but also through mobile phones as the facilitators collaborated to discuss and practice in a small chat group on WhatsApp and accept calls from their colleagues for consultation.

Moreover, mobile phones bridged the facilitators' beliefs by answering and responding to their members in the DP chat group. They became more confident in sharing with the other members in the DP. Mobile phones evoked the facilitators' action through the belief, moral and value dimensions by showing their activities and knowledge in chat groups or WhatsApp status.

5.4 Discussion

This subsection details the findings from mobile phone literature and the impact of mobile phones on teacher development in the frame of the national framework. The discussion would be supported by numerous references and the pros and cons of the research findings. The findings presented in Chapters 4 and 5 are discussed and examined in light of the literature reviewed in earlier chapters, reflecting on the developing themes that represent particular issues explored and explained in the study. The findings are discussed to explore the veracity of the theory of mobile learning compared to social constructivism in the teacher community and the extent to how teacher impact changed the accumulation of knowledge through mobile phones and collaboration activities in the national framework. The research brings the themes above together in answering each of the research questions (Figure 5-20).

Figure 5-20 Connectivity of research questions and themes



The researcher utilised the emerging themes to answer the research questions, and some themes can be used repeatedly in answering those questions. The researcher answered the research questions by looking at the general question about 'how teacher's perception on using mobile phone in aiding their continued professional

development' and continued to 'how mobile phones bridge the gap and help overcome the issues of geographical isolation to overcome the difficulties experienced by teachers on the knowledge of HOTS in the national framework'. The last is answering the research question about the knowledge exchange of teachers on HOTS knowledge in the national framework of Indonesia through mobile phones on the conceptual framework of this research'. In addition, the researcher collected information from experts in order to examine factual facts, studies, and conflicts about the research questions. Consequently, the researcher brought both pros and cons for discussion in answering the research question.

5.4.1 Teacher Perception on Using Mobile Phones in Aiding Their Continuous Professional Development

The first RQ in this study sought to determine teacher's perception on using mobile phones in aiding their CPD. Miao et al. (2017) via the UNESCO report suggested that many teachers in developing countries have a mobile phone and the current findings from this study seems to be consistent with Miao et al. (2017), that most teachers in this study have their own mobile phones. This result shows that most teachers owned a mobile phone, and there are various perceptions of teachers using mobile phones for their activities. The perceptions can mean a belief or opinion, often held by many people, and based on how things seem. This researcher asked about the perception of using mobile phones in the teacher's life. The findings show that a variety of perceptions was answered in this research regarding teachers' use of mobile phones by producing three existing perceptions: teachers' perception on mobile phones in daily routine activities, teachers' perception in supporting the learning process, and teachers' perception of using mobile phones in aiding their continuous professional development. The perception of the participants were from data where the majority was from the semi-structured interviews and FGD that appeared on the themes *My phones and I are friends*, and *All-round mobile phone*. This present finding is consistent with other research activities involving mobile phones by teachers for daily activities (APJII, 2018, 2019), learning aid in the class (Nikolopoulou, 2020; O'Bannon and Thomas, 2014; Thomas et al., 2014), and learning support for CPD (Adning et al., 2019; Howlett and Waemusa, 2018; McAleavy et al., 2018; Motteram et al., 2020).

Thus, this study produced results that corroborate the findings to a great extent of the previous work above.

The first perspective is the teachers' use of a mobile phone for daily routine activities. This perception appeared from the exploration of the utilisation of mobile phones for teachers in the Cigombong District in Chapter 4 (Section 4.4 on page 116) and appeared as a part of the theme *mobile phone and I are friends* (Subsection 5.3.2 on page 166). The teachers used their mobile phones for communication and lifestyle, news and general information, entertainment, product selling, online shopping, and games utilising several common applications installed on the mobile phones. The present findings seem consistent with other research, which found that people in Indonesia routinely used a mobile phone to connect to the internet for daily routine activities such as reading, online transactions, social media activity, entertainment, and others (APJII, 2018, 2019; Kominfo, 2017). According to Kominfo (2017), Facebook, Google, and YouTube are the most widely used applications in Indonesia. Those applications that Kominfo (2017) reported had been supported by this study where the teachers' perception revealed that they frequently used social media applications such as Facebook and Instagram to show their activities and thoughts to their colleagues. Other than that, they usually used Google and YouTube to search for any information and knowledge. The Teachers expressed that they usually used WhatsApp in their daily routine activities by calling, texting, and posting their activities. This finding supports the previous theory that WhatsApp has various types of communication, such as entertainment and sometimes for education purposes (Nedungadi et al., 2018).

What is interesting is that the mobile phone is part of their life. Rashid et al. (2020) believed that mobile phones are handheld devices that offer capabilities which are similar to the functionality of personal computer. It also allows people to connect to the world with a high-speed data connection anywhere, letting them be more productive (Rashid et al., 2020). Mobile technologies are spread widely and comprehensively integrated into our daily routine activities, and it seems likely that this integration will become even more personalised in the future (Persichitte et al., 2016). This belief seems embedded in the teacher's perception in this study. The teachers' perception said that mobile phones could not be separated from their lives, particularly that having

it ready at hand brings more advantages than disadvantages in the daily routine activities. This condition appears from the reflection on the theme *mobile phones and I are friends* (Subsection 5.3.2 on page 166). This reflection refers to the boundary of research in utilising mobile technology at the Cigombong District as a rural area, under the analysis of the types of mobile devices that are familiar to use and utilisation of mobile phones for routine activities and educational learning processes. Most of the teachers in the Cigombong District have a mobile phone with a packet data connection. These results differ from the Internet Association in Indonesia which estimated that less than half of the population living in rural areas have a mobile phone (APJII, 2018), but they are broadly consistent with the research by Kominfo (2017), where over half of the people who live in rural areas have a mobile phone. More importantly, the teachers in the Cigombong District have competent skills in using mobile phones, particularly those aged between 21 and 41 years old, and some of them who are proficient in using mobile phones had self-rated themselves as competent. These results match those observed in the earlier study, indicating that the younger teachers perceived themselves as experts in operating mobile phones compared to senior teachers (Adning et al., 2019).

The second finding confirms the teachers' perception of mobile phones as a tool that can support the learning process both in class and potentially in a wider environment. For example, the participants said that they utilised the mobile phone in class by watching videos and listening to audio podcasts on their mobile devices, including the action of the teachers using their mobile phones as a modem to access the internet, which the researcher mentioned in the themes reflecting *mobile phones and I are friends* and *all-round mobile phone*. This result matches those explored in an earlier study where mobile phones have become a learning tool in substantial potential classrooms and for outdoor learning (Fu and Hwang, 2018). Also, this study confirms that the teachers' perception of mobile phones in supporting learning is divided into two actions, namely the use of mobile phones to support the class's learning process, and support for continuous teachers' professional development. These findings further support the idea of mobile phones benefitting the class's learning process (Nikolopoulou, 2020; O'Bannon and Thomas, 2014; Thomas et al., 2014) and supports

the idea why a mobile phone is a promising tool in teacher development (Adning et al., 2019; McAleavy et al., 2018; Motteram et al., 2020).

The teachers believed that the mobile phone can support their class as a learning resource and learning tool. They believed that the mobile phone helps them search, find material, and source material for students in the class. Teachers actively search, check, and find learning material and text in class using a search engine such as Google and YouTube to support the content of learning in the class. This finding corroborates the ideas of Nikolopoulou (2020), who suggested that the mobile phone benefits students by offering and empowering their interest by supporting the learning process in class. Besides, the teachers felt more comfortable using mobile phones instead of laptops for search for information. This result agrees with the findings of other studies where the teachers were much more familiar in using a mobile phone than a laptop (McAleavy et al., 2018) to access the internet to search and find knowledge, educational applications, and play multimedia, with beneficial features in the mobile phones for students and teachers (Thomas et al., 2014). However, this study did not explore the disadvantages of mobile phones from the teachers' perception in supporting the learning process in class, as the study focused on the teachers' action in knowledge exchange in CPD rather than learning in a classroom using a mobile phone.

The third finding confirms the teachers' perception of using mobile phones in aiding their continuous professional development. McAleavy et al. (2018) believed that the mobile phone has enormous potential to enhance CPD. This belief appears to have been ingrained in the teacher's view as well. In this study, it is suggested that there is a positive perception of using a mobile phone to assist teachers in aiding their continuous professional development. This perception was demonstrated in what teachers were doing daily with a mobile phone. The teachers used a mobile phone to look for information and knowledge that they need through reading, searching, watching and communicating (Chapter 4, section 4.4 on page 116) and activities in the NTP and DP (Chapter 4 subsection 4.5.2 on page 125 and subsection 4.6.3 on page 147), as gathered from the semi-structured interview. Both of the activities above used in-direct support for the teachers' perception of CPD. This also is in accordance with an earlier study in the education field in Indonesia, which showed that activities

on the mobile phone included reading articles, watching videos, sharing articles, and downloading videos (APJII, 2018).

Moreover, the teachers' reports of their perceptions show that mobile phone helps process knowledge exchange in teachers' CPD. This finding was re-checked by looking at the teachers' action in activity in the NTP at the Cigombong District and DP in the 08 Ciadeg TWG (Chapter 4 subsection 4.5.2 on page 125 and subsection 4.6.3 on page 147), which are present in the theme 'all-round mobile phone'. This study produced results that corroborate the findings of previous work from several studies, in which technology integration was included in a collaborative community (Cifuentes et al., 2011; Curwood, 2011). Furthermore, teachers used the WhatsApp mobile application to support CPD, as shown by the teachers' perception of WhatsApp as an informal supplement in the NTP and DP. This research matches those observed in earlier studies in which the perception of teachers from Lampung Province in Indonesia was on the active use of mobile phones in a chat group in a teacher working group for teacher development activities (Adning et al., 2019), and the widespread access and frequent use of mobile internet among this group of teachers in six South Asian countries for teacher development programmes (McAleavy et al., 2018).

This section reviewed three mobile phone activities to answer the question about teachers' perception of using mobile phones in aiding teacher development. The first is the teachers' use of mobile phones for daily routine activities. The second is the use of mobile phones in the support of the learning process both in class or a wide learning environment, and the third is teachers' perception of mobile phones in aiding their continuous professional development. The majority of these findings are consistent with previous studies from Adning et al. (2019), APJII (2018, 2019), Kominfo (2017), McAleavy et al. (2018) and Nikolopoulou (2020). Even though there is inconsistency with other studies such as APJII (2018) that stated people living in rural areas have a mobile phone, some elements were not analysed in-depth due to the research focus and technique. Although this subsection explores the perception of a teacher using a mobile phone, it also contributes to other research questions related to teachers' activities in utilising a mobile phone to facilitate teacher's CPD. In the next subsection, some findings from the empirical research on the impact of mobile phones were discussed, where most teachers have mobile phones which assist in bridging the gap

and help overcome geographical isolation issues, and the difficulties they experienced in the knowledge of HOTS in a national framework.

5.4.2 Mobile Phone Bridges the Gap and Help Overcome the Issues of Geographical Isolation to Overcome the Difficulties Experienced by Teachers on Knowledge of HOTS in the National Framework

The second RQ is that mobile phone bridges the gap and helps overcome the issue of geographical isolation to overcome the difficulties experienced by teachers on PCK in the national framework. As mentioned in the literature review on Indonesia, there are typology and geographical issues as Indonesia is an archipelago country with 13,000 islands surrounded by the coast, mountains and the valley region, with over 7,000 districts disparately distributed across islands (B.-S. Indonesia, 2017; Hadiyat, 2014). According to Lestari (2019), the infrastructures have been identified as one of the missions for the national development to improve connectivity within the region of Indonesian islands. However, Hidayat (2014) reported that the developed infrastructure is not yet adequate, especially in the communication infrastructure, causing disparities in digital communication in Indonesia between West Indonesia and East Indonesia, and between urban and rural areas. The disparities have led to many villages in Indonesia to be isolated from information and technology. Furthermore, this study focused on a rural area with the most conditions in Indonesia: mountains and hills, and uneven broadband internet connection, where the sample area is the Cigombong District, near the capital city of Indonesia and one of forty Bogor Regency districts in the West Java Province. The discussion is divided into several points that lead to answers to this research question comprehensively and straightforwardly. The first discusses the category of isolation areas, and the second is that mobile phones demonstrated the capability to assist teachers in professional development in unexpected conditions. The third is that mobile phones can overcome geographical issues to solve the difficulties experienced by teachers.

The local government documents reported that the Cigombong District is surrounded by hills and mountains (Bogor, 2015). The typology and geography of the Cigombong District were investigated in Chapter 4 (Section 4.2 on page 103), which led to a theme 'aha condition in Cigombong District' early in this chapter (Subsection 5.3.1 on page

161). There are several possible explanations for this area as a geographical isolation issue: a lack of public physical infrastructure and uneven communication infrastructure at the Cigombong District. The first finding is that there was a lack of public physical infrastructure at the Cigombong District, such as difficulty in accessing the school by public transportation and car, classrooms could not accommodate students, and the condition of the classrooms was not conducive in most schools. Another important finding was the typology of teachers' residence in the Cigombong District, which impacted access to teachers from an outside area. The second finding is that there were uneven communication infrastructures such as internet broadband connections with uneven cable broadband connections in some areas. Some areas have connection, while others have none. Both of these barriers led to the idea of the issue of a geography isolation area. This study confirms that the Cigombong District is analogous with the definition of isolated rural areas, which (Correa et al., 2017) is described as lagging in physical infrastructure, technological infrastructure, education resources, and economy. However, this finding contradicts the development of the Government of Indonesia. A prior study has noted the importance of developing infrastructure in Indonesia, where infrastructure is a motor of national development to enhance Indonesia's productivity (Julianto, 2018; Lestari, 2019; Patty, 2018). Moreover, the current findings showed slight improvements recently in the infrastructure in the Cigombong District.

The demography of teachers in Indonesia was explored in Chapter 2 (Section 2.4 on page 27), particularly the demographics of teachers in the Cigombong District which was discussed in Chapter 4 (Section 4.3 on page 111). The demographics indicate that approximately one per cent of the population in Indonesia work as teachers. A similar finding was found in the Cigombong District where most teachers are between 20 and 39 years old (Kemendikbud, 2020). The biography of the participants showed that almost 13 out of 20 participants have 11 years of teaching experience. Only a minority of the participants have less than five years of teaching experience. However, one critical finding was that less than half of the teachers in the Cigombong District have a professional certificate from the government (Kemendikbud, 2020). However, the teachers have the appropriate education level and experience to teach in the Cigombong District (Kemendikbud, 2020; Statistics of Bogor Regency, 2020). It can

be concluded that the teachers in the Cigombong District have issues in improving teacher development, which was indicated by a low number of teachers obtaining professional certificates.

Another important finding connected to teachers' demographics in the Cigombong District is that all the participants have a mobile phone. The present finding seems consistent with other research that found many teachers in developing countries already have mobile phones (McAleavy et al., 2018). The most important clinically relevant finding was that teachers in the Cigombong District could operate a mobile phone based on their self-rating scores. Those findings have important implications for this study to look at the link between the demographics and developing the capability for teachers on the mobile phone. Nevertheless, McAleavy et al. (2018) argued that even the technology is familiar, training for teachers needs technical assistance during their learning. Without this, they are at risk of becoming frustrated and losing interest. This research showed teachers' frustration in accessing the content and knowledge when unfamiliar with the LMS and they faced barriers in accessing the content. A lack of time to facilitate the teachers in utilising the LMS through strategies to use mobile phones had caused them to be frustrated.

However, mobile phones demonstrated the capability to assist teachers to seek professional development in critical situations and unexpected conditions. This research illustrates the capability of mobile phones in a rural area, particularly in the Cigombong District, with the teachers' unique geography and demography. The positive perception of teachers contributed to maximise the capabilities of their mobile phones in order to support their continued professional development. There are many features embedded in the participants' mobile phones to support teacher development in the Cigombong District. Those features consist of social media, communication tools, and search engines, which are the standard features used in daily routine activities and support in the learning process. For instance, WhatsApp is a common application for teachers to communicate in the Cigombong District, where all teachers use this application to communicate with their members personally or in a group discussion by creating group chats for the members in the TWG. Another sample is Google and YouTube, which the teachers mostly mentioned as learning sources, and Facebook is the social media to show the action of a teacher to their colleagues

although the WhatsApp status is the most used feature in showing their actions in the Cigombong District. In addition, the competence of operating a mobile phone helps the teachers face critical situations in accessing supporting knowledge. For instance, some teachers can create and edit learning videos, use the mobile phone as a modem for their members, connect to laptops, and send files from the mobile phone through Google Drive.

Furthermore, this study supports the idea that mobile technology has really changed the modern educational technology ecosystem, which offers various methods of technology-based learning applications and has changed the landscape of implementing the educational process differently (Indrajit and Suparman, 2020). An in-depth illustration of mobile phones to overcome geographical issues by addressing the difficulties experienced by teachers on CPD can be looked at by utilising mobile phones in the NTP and DP in the Cigombong District. The action can be seen from the developed sub-categories accompanied by supporting nodes from the content analysis approach. The sub-categories are mobile phones replacing the LMS functions, mobile phones as tool devices, and WhatsApp as informal facilities. These sub-categories are from two themes, namely 'all-round mobile phone' and 'WhatsApp, which has proven to be an informal supplement to support the NTP in the Cigombong District and the DP in TWG 08 Ciadeg'. Strong evidence of mobile phones in overcoming geographical issues was found in this research:

1. An alternative mobile device to access the LMS.
2. Mobile phones can replace the functions of the LMS, such as for communication and discussion tools when they are not in class.
3. Mobile phones are used as a tool, such as a reader device and a modem device, when the cable and wireless connection are slightly difficult to access.

These findings support previous theory which links mobile phone and geographical issues, as seen in McAleavy et al. (2018) and Nikolopoulou (2020), who believed that mobile phones now cover large areas of the world with dynamic communication devices and can facilitate 'anytime and anywhere' learning. In addition, these findings are consistent with other theories that suggest mobile learning has been used to

address the need for appropriate, context-specific, and relevant developmental opportunities for teachers who work in challenging educational contexts, such as remote and rural locations (Motteram et al., 2020).

Furthermore, the geographic isolation caused some teachers to need extra time for discussions. The limitation of regular physical meetings out of the training session made the core teacher create a WhatsApp group chat. The WhatsApp group chat was selected by the core teacher because it is the most frequently used social messaging app in Indonesia, as reported by the Indonesian Internet service provider association (APJII, 2019). This application is commonly used for teachers to communicate in the Cigombong District, as it is free to share information or download images, videos and audio (Nedungadi et al., 2018). All the teachers have WhatsApp on their handphones and usually belong in certain chat groups. The theme *WhatsApp contribution in national framework* emerged from this finding. The current study found that the participants talked about the learning content and daily activity issues such as family issues, jokes, and school society in their chat group. These findings further support the idea that the number of text messages related to attendance was strongly positively correlated with the frequency of interaction between coordinator and teachers (Nedungadi et al., 2018). What is surprising is that teachers who were actively texting, sending pictures, or taking action in a chat group on WhatsApp were more successful in gaining competency certificates. The present findings seem consistent with other research in which WhatsApp supported language teacher development in the Zataari refugee camp. WhatsApp was used in the context of teacher education or training where access to training or education might be curtailed for several reasons (Motteram et al., 2020). This finding corroborated the success of the project in Kenya that used WhatsApp and Facebook platforms to connect participants with other teachers locally and international mentors to improve teacher development (McAleavy et al., 2018). Those findings further support the idea of mobile phones to assist teachers in facing critical situations in rural areas, as teachers use mobile phones in six countries in South Asia in mobile teachers' groups (McAleavy et al., 2018).

Furthermore, mobile phones are proven to assist teachers in the national framework in a rural area. When there was no restriction to bringing mobile phones into each

session, the teachers made the most use of their mobile phones to support teacher development. This supports the concept of mobile devices to deliver course content remotely, without the necessity of face-to-face interaction (McConatha et al., 2013). This interaction was captured in this research and explored in Chapter 4 (Section 4.5.2 on page 125 and Section 4.6.3 on page 147). The current study found that mobile phones were used to grab information and knowledge. This research identified two key points regarding mobile phone use in the national framework in a rural area. The first is the physical actions using a mobile phone during in-service activity training and on the job training, and the second is to exchange knowledge and transaction between participants through the mobile phone, discussed in the following section. The physical actions of mobile phones were used in learning both in class and out of the class. It was found that the participants had actively used their mobile phones in the class, including texting, calling, recording, and taking photos. Moreover, mobile phone use was not only for taking photos and recording but also for connecting to their laptops. Besides that, the mobile phone is a device to communicate between the facilitator, core teacher, and participants when there is no face-to-face meeting in training or dissemination activity. Those findings argue that mobile technologies have a high potential to improve teacher professional development's reach, scalability, and flexibility, which can be implemented in rural areas (McAleavy et al., 2018).

In this subsection, it has been answered that mobile phones bridge the gap and help overcome geographical isolation to overcome the difficulties experienced by teachers on knowledge in the national framework. This section describes geography and demography issues and argues that the Cigombong District has geographical isolation. It suggested that the mobile phone bridges the gap and helps to overcome the difficulties experienced on PCK in the national framework. Several clinical reviews of key aspects of mobile phones bridge the gap and help teachers in a geographical situation. The first is that teachers can operate a mobile phone and maximise the functions of a mobile phone. It was shown through several actions, such as teachers editing videos, sending files from the mobile phone, and using the mobile phone as a modem. The second is common features installed in the participants' mobile phones to support teacher development, such as WhatsApp, Google, and YouTube. These actions proved that the teachers involved in the national framework of NTP and DP in

the Cigombong District fully used mobile phones to overcome unexpected and isolated conditions. The following section considers how mobile phones transform their surface knowledge of teachers to other members in the national framework of Indonesia through mobile phones. In the end, their knowledge turned to deep and implicit knowledge.

5.4.3 Knowledge Exchange of Teachers on Knowledge of HOTS in National Framework Indonesia Through Mobile Phone

The third research question (RQ) is discussed in this subsection. This study sought to determine teachers' knowledge exchange on the knowledge of HOTS in the national framework of Indonesia through mobile phones. Consequently, the researcher constructed a conceptual framework to answer the question. The conceptual framework was described in Chapter 2 (Section 2.5 on page 60), and it is examined in this part to address the research question concerning teacher knowledge exchange for CPD. The conceptual framework design shows that mobile phones are likely to assist teachers' professional development through CPD activities in the national framework that makes their knowledge deep and valuable. This conceptual framework agrees with McAleavy et al., (2018), who showed that mobile technologies have a high potential to improve the reach, scalability, and flexibility of continued teacher professional development, particularly in developing countries. Although the conceptual framework did not deny the importance of a combination of professional learning with mobile phones and face-to-face elements emerged from all of the activities, this conceptual framework is in line with the reflection recommended that technology must not forget the human factor where mobile phones can strengthen coaching relationships and mobile technology can facilitate peer support, collaboration, and the creation of communities of practice (McAleavy et al., 2018).

The research took a case study in the activities of teachers' action on mobile phones in the NTP and DP in developing countries, particularly Indonesia in rural areas. As mentioned in the literature review, the mobile phone can contribute to continued professional development (Chapter 2, Section 2.4 on page 27). Furthermore, the researcher examined the conceptual framework on the NTP and DP through mobile phones and how the conceptual framework succeeds in knowledge exchange. There are several possible explanations for this result. The first is to exchange knowledge

between core teachers and participants in the NTP and the second is to exchange knowledge of the participants known as facilitators to members of the teacher working group (TWG) at DP on 08 Ciadeg TWG.

The first action is to exchange knowledge between core teachers and participants in the NTP. The exploration of the knowledge exchange was exposed in Chapter 4 (Section 4.5 on page 121) and the success in implementing the programme. However, this study found that the NTP result gave participants surface learning. A theme may explain it with relatively good reference to this result (Subsection 5.3.5 on page 202). The point of view that themes showed the transaction between the participants and core teacher was insufficient to develop the belief and moral value of participants. The finding from the current study is consistent with McAleavy et al. (2018), who found that most developing countries conducting in-service training for teachers was often ineffective. Furthermore, this finding agrees with Miao et al. (2017), that in most training programmes many teachers felt that the training was sometimes insufficient for their needs and also indicated a desire for additional continuous support, despite some institutions attempt to frontload interventions with in-depth workshops, orientations and other face-to-face preparatory meetings and demonstrations.

Other studies have considered that the concept of surface learning is more than teaching methods and techniques. It also involves understanding the values and assumptions embedded in their methodologies and materials (Motteram et al., 2020). This assumption is in line with what Shulman (2005) described, where the CPD approach that knowledge is formed through their values, beliefs, and attitudes to their knowledge for their new profession, which he described as the process of knowledge through three processes, namely surface, deep and implicit. However, some experts argued that learning has two levels of processing, surface and deep, to explain how learners intentionally direct attention toward learning materials to achieve the desired outcome (Faranda et al., 2021). The analysis result of the NTP strongly indicates that participants have surface learning before the programme. However, the participants had early knowledge of the HOTS approach in theory but less in practice before the NTP. In addition, this research found that the teachers were curious to improve their knowledge as a new profession on teaching by searching through mobile phones in the early stage. This finding supports previous research where the majority of the

teachers had minimal knowledge and did not clearly explain the concept and practice of the HOTS approach as many were confused about what constitutes HOTS and their specific strategies or learning methods (Rapih and Sutaryadi, 2018; Retnawati et al., 2018). Therefore, the Government of Indonesia created the NTP to develop more in-depth knowledge as continuing teacher professional development, described in Chapter 2 (Subsection 2.4.3 on page 40), as a response to the United Nations' fourth Sustainable Development Goal and mandated from a statute of Indonesia to continue teacher professional development.

Contrary to expectations from the government, this study did not find a significant improvement in participants' knowledge which is exposed in the theme *surface learning* (on page 202). Concerning what the government has done, this research discovered that the participants in that programme simply gained surface learning. This can be seen from the result of the programme assessment that the teachers felt dissatisfied, as shown by some participants who did not get a certificate and still have weak knowledge. Another finding showed that the teachers were still not fully confident after the training. This result contradicts Berge and Muilenburg (2013) with regard to knowledge as a state of mind, a set of beliefs, as an object or process to guide future actions or to maintain current abilities, or as a set of boundaries to understand information and to determine what information is needed to make a decision. In addition, surface learning is developed in the NTP by habitual, routine, and measurable tasks or visible acts. Although the teachers' assessment results were unsatisfactory in the NTP, in-depth knowledge emerged from early knowledge. Understanding the surface process knowledge means action by repeating the statement of knowledge without quotes or interpretation, without adding new elements or personal comments or advancing the idea, and using ideas or concepts that were presented, without adding personal comments or advancing the idea (Offir et al., 2008). This condition was found in the first analysis, which included the NTP as the first step of a conceptual framework. There were no value and moral knowledge shown in the first unit analysis that Boitel and Fromm (2014) argued that developing value in pedagogy must be "pervasive, routine and habitual", which earlier in this study was only habitual and routine without pervasive in their knowledge.

Early in this study, the teachers showed habitual routine and action to obtain knowledge. The current study found that the teachers habitually asked, requested, and shared the content of HOTS not only in the training session but also through mobile phones. The mobile phone transaction happened mostly out of the class in personal or chat groups. A core teacher routinely delivered the content and motivated the teachers to learn more and not only in the class. The core teacher bombarded the teachers with HOTS content through the mobile phone personally or in the chat group. Another supporting fact was shown by the theme *WhatsApp contribution in national framework*. In this theme, teachers were found to ask (tasks and assessment), discuss (task and learning topics), and share (photos, videos, and links) routinely over WhatsApp and word clouds. However, the findings showed no additional information shared by the teachers and core teachers, asking about the knowledge of HOTS. Thus, all the findings support the emerging surface knowledge of teachers in response to training activities. Surprisingly, mobile phones were found to assist the teachers in developing their knowledge in the NTP.

Interestingly, the mobile phone assists surface learning. Although surface learning was developed in the training activity, supporting activities were needed in which the mobile phones assisted the participants' knowledge. The present findings seem consistent with other research that found face-to-face elements blended with mobile phones supporting professional teachers in several projects in developing countries such as Bangladesh and Nigeria (McAleavy et al., 2018). In those projects, teachers were encouraged to discuss the content with colleagues at school and collaborate in local meetings with other school members (McAleavy et al., 2018). Furthermore, the idea of emerging surface knowledge by routine and visible act was demonstrated in the concept of continuing professional development as a strategy for the emergence of surface knowledge assisted by mobile phones. Therefore, this study concludes that the government programme in the Cigombong District brings surface knowledge rather than deep learning.

The second possible reason for the success in knowledge exchange was seen in the conceptual framework. The knowledge exchange came from participants who became facilitators for other members in the teacher working group (TWG) in the DP in 08 Ciadeg TWG. The exploration of exchange knowledge was exposed in Chapter 4

(Section 4.6 on page 139). This current study found that teachers had in-depth knowledge after the knowledge exchange in the DP, triggering the emergence of the theme of *deep learning* (Subsection 5.3.6 on page 211). Interestingly, mobile phones bridged beliefs, moral values, and visible action of a teacher to exchange knowledge with their peers as a process of deep learning. For example, mobile phones assist in the emergence of moral value seen in the cooperation and collaboration between core teachers, facilitators, and participants in knowledge exchange on these activities to develop deep learning. The collaboration of participants with their colleagues is consistent with Darling et al. (2017) for effective continuing teacher professional development, one of which is influenced by technology in collaboration for continuing professional development where collaboration uses mobile technology to bring a collaborative community endeavour. Moreover, the findings of the current study are consistent with those of Shulman (2005) about the meaning of professional development result that knowledge formed their value, beliefs, and attitudes to their knowledge. This is consistent with Offir et al. (2008) who defined deep learning as the capability of learning to evaluate by organising them in conceptions, comparison and creating existing information with a process that takes place when the learner converts new information into engraved concepts and relate it to their life experience.

The present RQ was designed to determine the effect of knowledge exchange among teachers on the knowledge in the national framework of Indonesia through mobile phones. This subsection discusses the knowledge exchange for teacher development which transformed knowledge from surface learning to deep learning in the knowledge of HOTS. The examining of surface learning was done in the government programme where the teachers were showing habitual, routine and action to get knowledge of HOTS in training sessions and mobile phones. This shows that the teacher's knowledge remained as surface knowledge from the facts and data shown above. Meanwhile, the examiner of deep knowledge had shown in the knowledge exchange process after the teachers disseminated their knowledge with the same pattern of government programme in TWG activities. The participants showed that they built their belief, moral value, and visible action on those activities in class or mobile phones. Interestingly, mobile phones assisted the teachers in the emergence of surface knowledge to deep knowledge as a technology bridge.

Overall, the discussion section examines three RQs by showing the pro and cons from many references and studies. The discussion reviews the findings on Chapter 4 and the themes that emerged. The first RQ in this study is teachers' perception on using mobile phones in aiding their continuous professional development, which showed various activities of mobile phone usage in daily routine activities and using mobile phones in aiding their knowledge in teacher development for CPD. Even though there is an inconsistent perception among the teachers regarding mobile phone activities with other research, there is a new contribution of knowledge in this field, such as teachers' perception based on living in rural areas. The second RQ examines the mobile phone in bridging the gap and helps overcome the issue of geographical isolation to overcome the difficulties experienced by teachers on HOTS in the national framework. The study showed that mobile phones have been proven as a bridge to assist teachers in professional development in critical situations and unexpected conditions by giving evidence of mobile phones in the implementation of the national framework in the rural area. The third RQ is how mobile phones transform surface learning of teachers to other members in the national framework of Indonesia through mobile phones to consider knowledge exchange in the rural area. This question refers to the process of surface learning and deep learning. This finding shows that surface learning emerged in the NTP. Although the teachers had early knowledge before the NTP, the capability of knowledge improved compared to before the NTP. Mobile phones increased teachers' knowledge by activities that they asked, shared, and discussed in the chat group. However, the values, morals, and beliefs did not emerge at this stage. The next activities caused the emergence of deep learning when teachers started to disseminate their knowledge through knowledge exchange in their community at the event of the DP. At this stage, mobile phones assisted to bridge the belief, moral value and visible action of teachers in knowledge exchange with their peers as a process of deep learning. Thus, deep learning emerged in the DP as a result of knowledge exchange activities which mobile phones likely helped the process.

Chapter 6

Conclusion

6.1 Chapter Outline

Chapter 5 has thoroughly discussed the findings and results of the qualitative case study. In this final chapter, the researcher attempts to summarise the essential findings and foreground of these findings against the research questions and conceptual framework of this study. The research outlined in the literature review will be revisited in light of this study's findings. Novelty knowledge from this study will be recommended for policy implementation to improve continued teachers' professional development in rural areas. The chapter concludes with suggestions for further study.

The main purpose of this study was to explore mobile phone utilisation on teachers' continued professional development in rural areas. The argument that mobile phones boost teachers' professional development, particularly in rural areas in Indonesia in this study against past research, has been established in Chapter 5 (Section 5.4 on page 218). Six themes have emerged to support this research, namely *'aha' condition of Cigombong district; the mobile phone and I are friends, all-round mobile phone, WhatsApp contribution in national framework, surface learning, and deep learning*.

The previous chapter has responded to the research questions of this study: What are the TWG members' perceptions concerning the use of mobile phones in aiding their continuous professional development? How can mobile phones bridge the gap and help overcome issues of geographical isolation in order to overcome difficulties experienced by teachers' development of teacher knowledge within Indonesia's national framework? How do mobile phones facilitate knowledge exchange by teachers concerning knowledge within Indonesia's national framework?

6.2 Contribution Knowledge

This research contributed to the education field by providing an overview of the utilisation of mobile phones in helping to achieve the United Nations' Sustainable Development Goals. There are seventeen goals in the UN's sustainable development

goals, and one of them is quality education (the UN's fourth Sustainable Development Goal). Thus, this research contributes to achieving the UN's fourth Sustainable Development Goal to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all'. Moreover, this research not only contributes to achieving the UN goal but also can be utilised in other countries surrounding Indonesia, where those countries are tied into one community region called the Association of Southeast Asian Nations and have similar geography conditions as Indonesia. They can adopt the utilisation of mobile phones in their areas through the conceptual framework developed in this study, and the African and South American countries or the education, health, or public sector can also adopt this concept.

Indonesia has a huge number of teachers with the potential to improve, and their professional development can be increased through mobile phone support. Mobile phones contribute by demonstrating their capability in assisting teachers in their professional development in rural areas. This contribution of mobile phone utilisation for the national framework can be seen by the teachers' habit in using the mobile phone for surface and deep learning of HOTS knowledge. The teachers' positive perceptions of mobile phones contribute to their maximum use in their continued professional development. The contribution does not stop there, as mobile phones also solve the gap in unexpected conditions in rural areas in Indonesia and help teachers get knowledge, information, and skills.

In addition, the critical perspective to the literature review has been highlighted. There is an optimistic view in the context of developing countries with a diverse set of factors such as typology, demography, infrastructure, and education system. The highlight of an education system focuses on exploring the curriculum system, recruitment system, teachers' competency, professional development, and teacher community. Furthermore, the critical analysis goes in-depth on the challenges of the professional development of teachers in the national training programme (NTP) and teacher community. The critical concept of pedagogy has been explored by presenting the collaboration between mobile technology and the concepts of surface and deep

learning of the teachers' knowledge. Therefore, the facts and evidence of those concepts were explored by answering the research questions in Chapters 4 and 5.

In brief, this research shows that mobile phones offer several clear affordances for teachers' professional development, particularly in the national framework, including an increased quantity and quality of teacher knowledge. Teachers' perception accounted for the enormous advantages of mobile phones where they used them to effortlessly communicate and share information quickly while their thoughts are fresh. Moreover, this research uncovers various teachers' perceptions on using mobile phones to support the learning system for students and teacher development as a learning aid, learning source, and daily routine activities.

Besides that, mobile phones support the education field or learning process in school and daily routine activities. This answers the current habitual action in daily activities for primary school teachers in using mobile phones in rural areas. Additionally, the mobile phone's compact design has eased individuals' lives, giving them a constant, uninterrupted means of communication, increasing the opportunity for contact, collaboration, and support in daily life activities. The mobile phone can blend with social rules because of the unobtrusive way it switches the activities through mobile phones from physical transactions to online systems. The teachers used mobile phones to communicate and for entertainment, online shopping, selling products, searching for news or information, and gaming. The teachers revealed that they frequently used social media applications such as Facebook and Instagram, and usually used Google and YouTube to search for information and knowledge. They expressed that WhatsApp was usually used for daily routine activities such as calling, texting, and posting. The surprising habitual daily routine activity is shown from the teachers' business transaction in selling products by promoting and displaying their products through the features on their mobile phones.

In addition, mobile phones offer a solution in teacher development to get values, morals, and beliefs from the knowledge of HOTS. This research presents that mobile phones can be a solution to the developmental challenges in continuous professional development, where the mobile technology's affordances lead to interaction with other colleagues by sharing, asking, discussing, and distributing knowledge. Those activities

support the understanding, deep learning and increase reflection of HOTS knowledge. The mobile phone is ideal for making short, frequent visits to websites, the LMS and chat groups, allowing teachers to break the pattern of completing the activities in a single sitting. This pattern gives teachers the flexibility to explore, search, and be exposed to new opinions, including reflecting the understanding of HOTS knowledge and approach. Moreover, social messaging applications form a learning pattern for teachers by allowing them to send text, as well as voice and video calls in one application embedded in the teacher's mobile phone to support teacher knowledge, such as WhatsApp, Telegram, Line, We Chat and others. Aside from that, mobile phone awareness develops activity repetition and routine learning, and the ever-present link in the mobile phones became a reminder for the teachers to repeat and routinely learn the knowledge. In the end, deep and implicit learning is achieved, and teachers could implement them in their teaching activity and exploit this connection in the learning process in class. Therefore, teachers' in-direct beliefs, morals, and values are developed during the process.

This study has demonstrated that mobile phones are the best possible for multi-tasks activities in the completed process of CPD. This finding is a surprising idea in terms of activity in CPD. Multitasking activities through mobile phone collaboration and combination with other activities or other devices were shown in Chapter 5 (Subsection 5.3.3 on page 174). In addition, the relationship with technology was characterised by a change from the traditional face-to-face meeting and discussion to virtual conversations and discussions through mobile phones. Thus, the teacher's relationship with the mobile phone was changed by introducing a new concept of learning and teaching in CPD that led some to re-evaluate their views of learning and teaching in CPD. These situations lead to mobile phones being a constant in a teacher's life. Therefore, this research answers how teachers utilised mobile phones to aid their professional development, which leads to comfort in using the technology for teachers. These activities show various activities to support teacher knowledge in the national framework with embedding learning for teachers. As a result, the conceptual framework proposed in this research can be used to develop targeted activities for teachers in the framework of CPD. Thus, teachers can situate learning in

an environment meant for learning, connecting the training content and their real environment.

Furthermore, the empirical findings in this study provide a new understanding of mobile phones that has been proven helpful for teachers in dealing with the geographical issue to gain teacher knowledge. The challenging conditions and situations in the rural area challenged the teachers to learn independently. Teachers felt hopeless about finishing their work to complete the professional development programme several times. This study shows that mobile phones help teachers overcome their hopelessness by bridging the gap from the geographical issue that impedes the learning process, hence, easing the training delivery system and difficulties experienced by teachers on HOTS knowledge in the national framework. Mobile phones show the capabilities to overcome geographical issues through the features, functions, and services provided. Other devices have limitations with portability, handheld capability, and ease to carry out and operate, making mobile phones superior. Teachers use mobile phones as more than just a tool (modem, reader, camera, and recorder), but also a learning resource (searching, download, distributed) to handle knowledge and skill from the teacher knowledge.

In general, this research can be a reference in the field of education. This research hopes to contribute to achieving the UN's fourth Sustainable Development Goal. This study shows that mobile phones have supported teacher professional development in immersing the knowledge for teachers in rural areas with unexpected conditions. Moreover, mobile phones offer several clear affordances for teachers' professional development, particularly in the national framework, including an increased quantity and quality of knowledge for teachers by giving the best possible multi-tasks activities in the completed process of CPD. Mobile phones have been presented as a solution to the development challenges in CPD. The mobile technology's affordances lead to interaction with other colleagues by sharing, asking, discussing, and distributing the knowledge to develop teachers' values, beliefs, and moral dimensions.

6.3 Implications for Policy and Practice

There are several implications for policy and practice based on the results of this study. The fundamental nature of this research is to explore the situation for teachers in utilising mobile phones in rural areas to assist CPD. This study did not evaluate the national framework and professional development process from the government but focused on the phenomenal mobile phone activities in specific rural areas that have already been captured in this research. The findings of this research can give novelty of knowledge and information for stakeholders involved in this project and the next project for the central or local government to organise professional development for teachers in the future by involving mobile technology. Therefore, the present study's findings have implications for several stakeholders, including academic researchers, government agencies responsible for the overall development of CPD, particularly for central and local government, and social communities such as teacher working groups. However, the extent to which the results can be applied in other contexts depend on the reader to adopt this research to their condition. The following discusses the results in light of broader system-wide policy implications and specific problems of practice faced in the NTP and DP in the national framework.

The first is the general implication policy by the MoEC RI and local government. The NTP and DP should be continued for teachers within the context of the national framework in order to contribute to the UN's fourth Sustainable Development Goal. The programmes had been proven for teachers to boost teacher learning knowledge and capability particularly in knowledge of the HOTS approach, not only for surface but also deep learning in that content. Teachers were actively involved in both activities shown in the LMS, physical presence and chat group. Another important practical implication is that teachers who complete the NTP may continue to exchange knowledge with other peers or colleagues in their school or area using the help of mobile phones. The teachers can use familiar applications to disseminate their knowledge, such as social messaging applications (WhatsApp, Line, We Chat) and social media (Facebook, Instagram, Youtube) through mobile phones. This activity impacts the MoEC RI, which helps the government socialise its programmes and gain knowledge from teachers involved in that programme. Therefore, the MoEC RI and

local education authorities should also consider mobile technology in the learning process for CPD and socialise the program.

However, several important changes need to be made. The MoEC RI and local government must be working together to monitor the programmes. Local governments must support the MoEC RI programme by creating a dissemination programme afterwards. The local government needs to embrace a teacher community to create a dissemination programme after the government programme is completed. In this study, local governments facilitated the DP activities by involving TWG to allow teachers to participate in the knowledge exchange process for teachers who did not get the opportunity to partake in the NTP activities. There is, therefore, an implied policy for the MOEC RI and local government to create a sustainable programme.

The MoEC RI does not explicitly state permission to use other infrastructure devices to support learning programs, especially learning content, communication and access to the LMS. In contrast, the internet access gap is still high between cities and rural areas in Indonesia, and most people in Indonesia have mobile phones rather than laptops. Ideally, the central government should encourage the development of the BTS tower as an alternative signal to cover specific areas rather than provide broadband cable connection. The MoEC RI should empower mobile phones in any teacher development programmes by entering or integrating the mobile phone as a supporting facility in the learning process for the teachers. Furthermore, the MoEC RI should provide alternative devices to develop a national programme by providing the learning strategy and method using mobile phones integrated into the mainstream teacher credentialing programme which constitute a pillar of professional development efforts. Thus, teachers can maximise reaching and accessing the knowledge, content, and information anytime and anywhere. Moreover, this opportunity can be used for the local government to adopt new strategies in learning through mobile phones in professional development for their area without ignoring the conventional meeting.

The second policy has a broader impact on the teacher community. The teacher community, in particular TWG, should be involved in the MoEC RI and local government programmes, both with and without a budget from the government. TWG

is the right place to disseminate knowledge and programmes from the MoEC RI and local government policy. The important practical implication is that TWG should empower mobile technology to support their activities. In this study, the majority of the TWG members have mobile phones. A positive perception of the mobile phone benefits teachers and members of these communities. The community created a social messaging group to support all the activities. They had several small group chat discussions through a mobile phone to facilitate information sharing and hone their knowledge. Furthermore, TWG has shown how they maintain the knowledge to be deep-learning with the assistance of a mobile phone. Therefore, TWG should be supported by a local government to create a dissemination programme and knowledge base. This activity impacts the MoEC RI, which helps the government socialise its programmes and gain knowledge from teachers involved in them.

The third is the implication for academics. The finding of this study is of great value and has significant implications for the research community. This implication can be classified into two perspectives: literature/content related and method related. For the literature related, this research is rich in knowledge of teachers' continuing professional development through the mobile phone, a rare study in teachers continuing professional development. There are obvious links between harnessing mobile phones in supporting work in the education field (Baran, 2014; McAleavy et al., 2018; Motteram et al., 2020). The mobile phone has the potential to be applied to any teacher education programme to support continued teacher professional development in developing countries, where access to training or education might be curtailed for some reasons (Motteram et al., 2020). Mobile phones play an essential element in supporting the knowledge exchange to develop surface and deep learning of teachers in the context of the community group (TWG) in a complex environment (rural area) in Indonesia, rather than focusing on examining equity and inclusivity of teachers. Besides, a unique contribution in the literature has been made in this study by combining the literature on teachers' continuous professional development and geographical issues to use mobile phones to overcome the difficulties experienced by teachers in acquiring knowledge within the national framework.

This study also has implications for a model or conceptual framework in the education field. The study has also produced a conceptual framework, which has been proposed

for improving professional teacher performance outcomes through mobile phones in rural areas and contextual situations in framing the national programme. The conceptual framework assists in understanding the adoption of mobile technology in Indonesia. There are empirical findings that have been highlighted, which is the importance of the mobile phone to assist teachers in the national framework. In this study, the mobile phone assists teachers in grabbing knowledge in activities in the NTP and DP. In addition, inferring from the discussion, the potential adoption of a mobile phone could influence teachers to immerse their knowledge, encouraging academics, particularly those interested in studying the adoption of new technology in CPD and a complex environment, to pay attention to the potential impact of a mobile phone. In this respect, the study reaffirms the applicability of a mobile phone to study the innovation's adoption in a community setting from the context of developing countries.

From a methodological perspective, this study has implications for success using the case study's embedded design. A sequential exploratory method approach was used in the case study. This study explored the phenomenon of teachers' interest using mobile phones by conducting semi-structured interviews, followed by other methods such as observation form and digital media records to confirm the findings of the qualitative method. In doing so, the researchers would uncover new issues that might not be covered by other research. This research offers a wealth of treasures in developing research methods, especially case studies.

The fourth is technology implications. This study's findings also have implications concerning the technology context. In broad terms, the findings highlight the importance of mobile technology attributes that are significant in improving teacher knowledge in terms of capabilities, flexibility, collaboration, and ease of use. The mobile phone is a handheld device that offers capabilities similar to personal computer functionality supported by 3G and 4G capacity to allow individuals to connect to the world with a high-speed data connection anywhere, letting them be more productive (Rashid et al., 2020). The capability of the mobile phone had been demonstrated to overcome the geographical issue by presenting the features, functions, and services provided. In contrast, other devices have limitations with portability, handheld, and ease to carry out and operate, thus, making mobile phones superior in dealing with

this issue. This study shows that mobile phones have proven to be a bridge for teachers to overcome the issues of geographical isolation in order to achieve their learning goal in the national framework. The teachers in this study were challenged by the limitations of facilities in completing the NTP and DP. However, the challenge was answered by mobile phones that show the capability of to overcome that problem. The teachers had shown the capabilities of mobile phones as modems for connection, a reader device, a recorder device for re-learning, searching device, and taking photos to support teacher knowledge. The mobile phone can handle the uneven broadband cable wireless connection where teachers can move around to find a signal to access the internet. Therefore, the mobile phone is a learning resource for the teachers to support their knowledge and a tool to help the learning process.

The ease of use, speed and distance afforded by the mobile phones enabled teachers to take greater control of when, how, and how much they communicate with other colleagues to do knowledge exchange at the same as doing their tasks, assessment, coursework, or other activities. There are various common applications embedded in their mobile phones, such as WhatsApp, Facebook, Google, YouTube, and other standard applications on the mobile phone. Furthermore, the positive perception of a mobile phone in this study showed that the mobile phone occupies a central position in the teacher's lives. This position does appear to move to an even more central position when used for the learning process in class and teacher development. The mobile phone is not only for daily routine activities but also to support the learning process in class and teacher development. One form of supporting mobile phones in professional development had been proven in the NTP and DP. The core teachers permitted the teachers to carry and use their mobile phones in the sessions. This condition was advantageous for the teachers to dive into the material by looking, searching, distributing, and sharing various information simultaneously in the sessions.

Collaboration is afforded by the mobile phone through a social messaging application commonly used by teachers, namely WhatsApp. In this study, WhatsApp was proven to be an informal supplement to support teacher knowledge. The collaboration activities outside of class, such as discussing, sharing, and asking questions, were carried out via group and personal chats through WhatsApp. These activities

increased teacher knowledge by giving them more opportunities to discuss and practise their knowledge of HOTS that might increase their sense of ownership over their learning for the teachers who use mobile phones. The communication among teachers improved, and simultaneously, they encouraged their peers while respecting their right to control their replies. This control is beneficial for teachers to embed more knowledge and responsibilities in their posts. Besides, collaboration does not happen only with teacher interaction on a mobile phone but also in learning infrastructures, such as when the LMS is not mandatory for communication tools and delivery programmes. The core teacher can collaborate with other applications by selecting a common application used by the teachers, which is, in this study, core teachers collaborated with WhatsApp.

The fifth is teacher implication. As a practitioner in this study, the teacher has positive implications for the future. The empirical findings in this study provide a new understanding of mobile phones to assist teachers in developing the surface and deep learning of HOTS knowledge. Therefore, this study's findings are valuable and have significant consequences for individual teachers utilising a mobile phone. This study reports the advantages for those who use mobile phones are maximised in continued professional development. The teachers who contributed more in the chat conversations to publish the idea of knowledge through mobile phones had good results and confidence compared to the teachers who were less active in the use of mobile phones. It can be shown on the NTP results even though further research needs to be done on this aspect. There is a suggested course of action for teachers in the programme. For instance, teachers can be more active in the quantity of collaborative involvement amongst participants by sharing, asking and discussing through the mobile phone, which is a probability in assisting teachers to develop surface and deep learning of HOTS knowledge. The teachers had shown a positive perception of using mobile phones. They used a mobile phone for their daily activities and to support learning in class as well as teachers' continuous professional development. The mobile phone is a handheld device for teachers to support learning teacher knowledge by flexibility of use (McAleavy et al., 2018). In this study, the core teachers had initiative to present the ever-present link in mobile phones which became a reminder for the teachers to repeatedly and routinely learn the knowledge until the

end of the process. Therefore, teachers should take the opportunity to maximise the utilisation of a mobile phone in professional development by accessing mobile phone resources individually for professional development anytime and anywhere.

6.4 Limitations

There were several limitations with this study that may have limited the range and depth of the results. The first is the method of this research. This research is a qualitative research with a case study. Therefore, the case study method has weaknesses and advantages in several parts. For instance, this study focused on a single area, and Indonesia has many rural areas. Thus, it cannot be generalised as a holistic approach for rural areas in Indonesia and is not representative of the condition in the exploration of teachers' actions with mobile phones in rural areas in Indonesia. However, the method is open to being adopted in other areas.

The second is not evaluating the government programmes. The government has their own evaluation, while this research explored the action of teachers using mobile phones in the national framework for CPD. Even though the teachers were evaluated in the NTP, that assessment is a guideline for this study to examine how knowledge emerged and not look at the teachers' weaknesses in their knowledge. Thus, the limitation of this study is not comparing what the government has done and the teachers' result action. Therefore, further research should be done using other methods and strategies to look at synchronisation used in quantitative research. The third limitation of this study is not looking at the students' effect of implicit knowledge of teachers in HOTS knowledge. There were barriers to this situation that time, budget, and the pandemic made it hard for this study to follow the implicit knowledge of teachers in the implementation in class as the effect of knowledge from teachers in applying the HOTS approach, which is embedded in their body and soul. Therefore, this study is an early stage of research for further study to look at the effect of teachers in class.

6.5 Further Research

This study is far from ideal, but it attempts to investigate mobile phone usage accurately in the national framework using various techniques. Besides, this study does not justify the pattern of teachers' activities in using mobile phones to support CPD, instead only exploring their activities in using a mobile phone in CPD. Thus, the shortcoming of this study is not to fully assess the success of teachers in using mobile phones, as it is limited to exploring teacher actions in knowledge exchange through mobile phones within the national framework and not to generalise the condition of teachers in rural areas. Therefore, an in-depth study needs to be conducted in the future.

The following are recommendations for future research. This study provides a firm basis to further explore teachers' professional development through mobile phones. The methods employed are widely used in the social sciences and should thus be respected. Furthermore, they have considerable reflection and explanation for future researchers and may enhance their research and data collection methods. In the planning of this research, where the focus of the exploration was the habitual action of teachers in knowledge exchange through mobile phones in the national framework, it was considered appropriate to improve teachers' HOTS knowledge in the knowledge of HOTS approach. While this was considered a weakness, it is a novel way of learning the strategies used in the context of rural area of Indonesia for teachers' development, and it was considered appropriate to determine how mobile phone usage can be implemented in the national framework in a rural area. It provides a basis for other researchers to extend the study beyond this limitation while not detracting from the proposals' cogency for changing learning strategy and education delivery systems. Indeed, the recommendations presented here provide a building block for the advancement of learning strategies and facilitate the utilisation of mobile devices and other outcomes as they are implemented.

This study is concerned with the teacher professional development in rural areas and its need to improve teacher knowledge outcomes, in this case, by mobile phone. No specific application was the focus of this study. Therefore, other researchers may wish to explore the outcome of mobile phones across the different aspects of learning strategies and applications on mobile phones. The current study focused particularly

on the knowledge exchange of teachers through mobile phones in the national framework to develop value, moral, and belief dimensions. Further studies will be necessary to investigate the teachers' teaching results with their students as the result of value, moral, and belief dimensions with their colleagues. Research should be dedicated to investigating teachers' awareness in using the mobile phone in continued professional development and how their understanding of this, and the functions featured on mobile phones might influence their learning goal, strategies, plans and design. We might also need to consider the capabilities of the teacher using technology and condition areas to offer further insights into the differences in learner achievement in an online environment. This study has highlighted the exploratory nature of this study and how it may provide a basis for further research. More importantly, the recommendations based on the findings could be used to advise policymakers and others in authority in their endeavours to improve professional teachers in Indonesia as part of the vision of MoEC RI and its long-term objectives.

References

- Adning, M., Sari Dj, D., & Nur Hayati, K. (2019). *Teacher perception using the mobile phone in the teacher working group; Age matters* (No. 8411320). International Institute of Social and Economic Sciences
- Aguinis, H., and Solarino, A. M. (2019). Transparency and replicability in qualitative research: The case of interviews with elite informants. *Strategic Management Journal*, 40(8), 1291-1315.
- Al-Kindi, I., and Al-Khanjari, Z. (2021). NVivo to Analyze the Definition of Student EBQ Qualitatively. *Available at SSRN 3768217*.
- Al Rasyid, H. (2017). Fungsi Kelompok Kerja Guru (KKG) Bagi Pengembangan Keprofesionalan Guru Sekolah Dasar. *Sekolah Dasar: Kajian Teori dan Praktik Pendidikan*, 24(2), 143-150.
- Ally, M., and Prieto-Blázquez, J. (2014). What is the future of mobile learning in education?. *International Journal of Educational Technology in Higher Education*, 11(1), 142-151.
- APJII, B. (2018). *Survei APJII: Penetrasi Internet di Indonesia Capai 143 Juta Jiwa*. Apjii Available at: <https://apjii.or.id/downfile/file/BULETINAPJIIEDISI22Maret2018.pdf>.
- APJII. (2019). *Hasil Survei Penetrasi dan Perilaku Pengguna Internet Indonesia 2018*. Retrieved February 2, 2021, from <https://www.apjii.or.id/content/read/39/410/Hasil-Survei-Penetrasi-dan-Perilaku-Pengguna-Internet-Indonesia-2018>
- Ariyana, Y., Bestary, R., & Mohandas, R. (2018). Buku pegangan pembelajaran berorientasi pada keterampilan berpikir tingkat tinggi. *Direktorat Jenderal Guru dan Tenaga Kependidikan Kementerian Pendidikan dan Kebudayaan Hak*.
- Asghar, M. & Pilkington, R. (2018) The relational value of professional dialogue for academics pursuing HEA Fellowship. *International Journal for Academic Development*, 23 (2), 135–146. doi:10.1080/1360144x.2017.1386566
- Aubusson, P., Schuck, S., & Burden, K. (2009). Mobile learning for teacher professional learning: Benefits, obstacles and issues. *ALT-J*, 17(3), 233-247
- Ayubayeva, N. (2018). *Teacher collaboration for professional learning: Case studies of three schools in Kazakhstan*. (Doctoral dissertation, University of Cambridge).
- Awaluddin, Y. (2018). Effectiveness of guru pembelajar program in improving social studies teacher competence by using fully online and blended learning mode: Evaluative and comparative study. *Jurnal Pendidikan Dan Kebudayaan*, 3(1), 1-16.
- Bacon-Shone, J. (2015). *Introduction to Quantitative Research Methods*. pres. Loughborough University.

- Baishya, D. and Maheshwari, S., (2020). Whatsapp groups in academic context: Exploring the academic uses of whatsapp groups among the students. *Contemporary Educational Technology*, 11(1), pp.31-46.
- Bakri, F. and Budi, S., (2015). Analisis hasil uji kompetensi guru fisika. *Jurnal Penelitian & Pengembangan Pendidikan Fisika*, 1(1), pp.91-96.
- Bappedalitbang. (2018). *Kabupaten Bogor: Toward The Most Developed Regency In Indonesia*.
https://issuu.com/ipwbappedalitbangbogor/docs/ipw_bappedalitbang_-_profil_infrast
- Baswedan, A. R. (2014). *Gawat darurat pendidikan di Indonesia*. In *The Emergency of Indonesian Education*. A paper delivered at the meeting between Ministry and Head of Education Offices Indonesia-wide in Jakarta, on December (Vol. 1).
- Baran, E. (2014). A review of research on mobile learning in teacher education. *Journal of Educational Technology & Society*, 17(4), 17-32.
- Bayhaqi, A. (2006). *Education And Economic Growth In Indonesia* [Dissertation]. Singapore: National University Of Singapore
- Baxter, P., & Jack, S. (2008). Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. *The Qualitative Report*, 13(4), 544-559.
- Beauchamp, G., Burden, K., & Abbinett, E. (2015). Teachers learning to use the iPad in Scotland and Wales: A new model of professional development. *Journal of Education for Teaching*, 41(2), 161-179.
- Biesta, G., Allan, J. and Edwards, R., (2014). Making a difference in theory. *Abingdon, UK: Routledge*.
- Berge, Z. L., & Muilenburg, L. (Eds.). (2013). *Handbook of mobile learning*. Routledge.
- Bestary, R., Zalilia, L., & Ariyana, Y. (2019). Buku Pegangan Guru Inti di Sasaran Zonasis. *Direktorat Pembinaan Guru Pendidikan Menengah dan Pendidikan Khusus*.
- Bogdan, R. C., & Biklen, S. K. (2007). *Research for education: An introduction to theories and methods*.
- Bogor, K. (2015). Bogor Regency in Figures. *Badan Pusat Statistik-Kabupaten Bogor*.
https://westjavainc.org/wp-content/uploads/2016/04/Kabupaten-Bogor-Dalam-Angka-2015_opt.pdf
- Boitel, C.R. and Fromm, L.R., (2014). Defining signature pedagogy in social work education: Learning theory and the learning contract. *Journal of Social Work Education*, 50(4), pp.608-622.
- Bryman, A. (2012). Edition 4. *Social research methods*. New York. Oxford University Press Inc.

- Brookfield, S. (2017). *Becoming a critically reflective teacher* (2nd ed.). Jossey-Bass
- Budiastuti, D., & Bandur, A. (2018). *Validitas dan Reliabilitas Penelitian. Dilengkapi Analisis Data dengan NVivo, SPSS, dan AMOS*, Jakarta: Mitra Wacana Media.
- Burns, M. and Lawrie, J., (2015). *Where it's needed most: Quality professional development for all teachers. New York, NY: Inter-Agency Network for Education in Emergencies.*
- Cetinkaya, L. (2017). The impact of WhatsApp use on success in education process. *International Review of Research in Open and Distributed Learning, 18*(7).
- Chung, C. J., Hwang, G. J., & Lai, C. L. (2019). A review of experimental mobile learning research in 2010–2016 based on the activity theory framework. *Computers & Education, 129*, 1-13.
- Cifuentes, L., Maxwell, G. and Bulu, S., (2011). Technology integration through professional learning community. *Journal of Educational Computing Research, 44*(1), pp.59-82.
- Clarke, B., & Svanaes, S. (2015). *Updated review of the global use of mobile technology in education. London.* Retrieved from [http://www.kidsandyouth.com/pdf/T4S FK% 26Y Literature Review](http://www.kidsandyouth.com/pdf/T4S%20FK%20Literature%20Review), 11, 15.
- CNN Indonesia. (2019). *Pelatihan Basis Zonasi Jadi Cara Kemendikbud Kembangkan Guru.* CNN Indonesia.
- Coe, R., Waring, M., Hedges, L. V., & Arthur, J. (2017). *Research Methods and Methodologies in Education.* Los Angeles, London, New Delhi: SAGE Publications Ltd.
- Cordingley, P., Higgins, S., Greany, T., Buckler, N., Coles-Jordan, D., Crisp, B., Saunders, L. and Coe, R., (2015). *Developing great teaching: Lessons from the international reviews into effective professional development.*
- Correa, T., Pavez, I., & Contreras, J. (2017). Beyond access: A relational and resource-based model of household Internet adoption in isolated communities. *Telecommunications Policy, 41*(9), 757-768.
- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches.* Sage publications.
- Curwood, J.S., (2011). Teachers as learners: What makes technology-focused professional development effective?. *English in Australia, 46*(3), pp.68-75.
- Darling, L., Hyler, M.E. and Gardner, M., (2017). *Effective teacher professional development.* Learning Policy Institute.
- Dapodik. (2020). *The number of teacher and students.* DAPODIK. <https://dapo.dikdasmen.kemdikbud.go.id/guru/3/020538>

Dewi, Z. R. (2019). Penataan Guru Mata Pelajaran Matematika SMA Negeri di Provinsi Jawa Timur. *Inspirasi Manajemen Pendidikan*, 7(1).

Djaja, S. (2017). Harapan dan tantangan guru pembelajar moda daring. *Jurnal Pendidikan Ekonomi: Jurnal Ilmiah Ilmu Pendidikan, Ilmu Ekonomi dan Ilmu Sosial*, 10(2).

Disdikprolap. (2019). *Disdik Lakukan Penguatan Kompetensi Ketua KKG SD*. Dinas Pendidikan Kabupaten Bogor.
<https://disdik.bogorkab.go.id/post/disdik-lakukan-penguatan-kompetensi-ketua-kkg-sd>

Dokhi, Muhammad; Siagian, Theodora H; Sukim; Wulansari, Ika.Y:Hadi, Dwi W; Sambodo, N. (2016). Analisis Kearifan Lokal Ditinjau dari Keragaman Budaya. *In PDSPK Kemendikbud RI*.
http://publikasi.data.kemdikbud.go.id/uploadDir/isi_F9B76ECA-FD28-4D62-BCAE-E89FEB2D2EDB_.pdf

Dreyfus, H., & Dreyfus, S. (2005). *Novice to Expert: the Dreyfus model of skill acquisition*. Devmts.Co.Uk. <http://devmts.org.uk/dreyfus.pdf>

Eaton, S. E., Brown, B., Schroeder, M., Lock, J., & Jacobsen, M. (2017). Signature Pedagogies for E-Learning in Higher Education and Beyond. *Online Submission*.

Eaton, S. E., Wagner, S., Hirashiki, J., & Ciancio, J. (2018). Understanding and Exploring Signature Pedagogies for TESOL Teacher Education. *Online Submission*.

Elo, S. and Kyngäs, H., (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1), pp.107-115.

Entwistle, N. J., McCune, V., & Tate, H. (2013). *Approaches and Study Skills Inventory for Students (ASSIST)* (incorporating the Revised Approaches to Studying Inventory. RASI.
https://www.researchgate.net/publication/260291730_Approaches_and_Study_Skills_Inventory_for_Students_ASSIST_incorporating_the_Revised_Approaches_to_Studying_-_RASI

Entwistle, N. and Waterston, S., (1988). Approaches to studying and levels of processing in university students. *British Journal of Educational Psychology*, 58(3), pp.258-265.

Fahdini, R., Mulyadi, E., Suhandani, D., & Julia, J. (2014). Identifikasi Kompetensi Guru sebagai Cerminan Profesionalisme Tenaga Pendidik di Kabupaten Sumedang. *Mimbar Sekolah Dasar*, 1(1), 33-42.

Faizal, E. B. (2016). Palapa Ring project to bring faster internet to Indonesia. *The Jakarta Post*. <https://www.thejakartapost.com/news/2016/03/06/palapa-ring-project-to-bring-faster-internet-to-indonesia.html>.

- Faranda, W.T., Clarke, T.B. and Clarke III, I., (2021). Marketing Student Perceptions of Academic Program Quality and Relationships to Surface, Deep, and Strategic Learning Approaches. *Journal of Marketing Education*, 43(1), pp.9-24.
- Febriana, M., Nurkamto, J., Rochsantiningsih, D., & Muhtia, A. (2018). Teaching in rural Indonesian schools: Teachers' challenges. *International Journal of Multicultural and Multireligious Understanding*, 5(5), 11-20.
- Fenton, D. (2017). Recommendations for professional development necessary for iPad integration. *Educational Media International*, 54(3), 165-184.
- Flick, U. (2018). *The Qualitative Data Collection*.
- Fu, Q. K., & Hwang, G. J. (2018). Trends in mobile technology-supported collaborative learning: A systematic review of journal publications from 2007 to 2016. *Computers & Education*, 119, 129-143.
- Gerring, J. (2006). *Case Study Research: Principles and Practices*. New York: Cambridge University Press.
- Goffman, E. (2001) 'On fieldwork' in Emerson, Robert M (ed), *Contemporary Field Research. Perspectives and Formulation*. Prospect Heights, IL: Waveland Press.
- Google. (2011). *The Mobile Movement Study: Understanding Smartphone Users*. U.S.: Google/Ipsos OTX MediaCT
- Grbich, C., (2012). *Qualitative data analysis: An introduction*. Sage.
- Guba, E.G. and Lincoln, Y.S., (1994). Competing paradigms in qualitative research. *Handbook of Qualitative Research*, 2(163-194), p.105.
- Hadiyat, Y. D. (2014). Kesenjangan Digital di Indonesia (Studi Kasus di Kabupaten Wakatobi). *Pekommas*, 17(2), 222391.
- Hairon, S., & Tan, C. (2017). Professional learning communities in Singapore and Shanghai: Implications for teacher collaboration. *Compare: A Journal of Comparative and International Education*, 47(1), 91-104.
- Handayani, D., Lisdiana, A., & Ariyana, Y. (2018). *Petunjuk Teknis Program Peningkatan Kompetensi Pembelajaran Berbasis Zonasi*.
- Hargreaves, L., Kvalsund, R. and Galton, M., (2009). Reviews of research on rural schools and their communities in British and Nordic countries: Analytical perspectives and cultural meaning. *International Journal of Educational Research*, 48(2), pp.80-88.
- Hayes, D. (2015). Innovations in the continuing professional development of English language teachers. In D. Hayes (Ed.), *Innovations in the Continuing Professional Development of English Language Teachers*. British Council 2014.

Heflin, H., Shewmaker, J., & Nguyen, J. (2017). Impact of mobile technology on student attitudes, engagement, and learning. *Computers & Education*, 107, 91-99.

Herliani, E., & Heryati, E. (2017). Pengembangan Keprofesian Berkelanjutan Sekolah Dasar (H. Arikunto, A. Hafina, & H. Kusberniadi (eds.)). *Direktorat Pembinaan Guru Pendidikan Dasar*, Kemendikbud.

Hidayati, A. U. (2017). Melatih keterampilan berpikir tingkat tinggi dalam pembelajaran matematika pada siswa sekolah dasar. *Terampil: Jurnal Pendidikan Dan Pembelajaran Dasar*, 4(2), 143-156.

Hindi, A. M., Willis, S. C., & Schafheutle, E. I. (2022). Using communities of practice as a lens for exploring experiential pharmacy learning in general practice: Are communities of practice the way forward in changing the training culture in pharmacy?. *BMC medical education*, 22(1), 1-10.

Hord, Sh. (2013). Professional Learning Communities. In *National Staff Development Council* (Vol. 30, Issue 3). <https://doi.org/10.1021/jo01073a611>

Howlett, G., & Waemusa, Z. (2018). Digital Native/Digital Immigrant Divide: EFL Teachers' Mobile Device Experiences and Practice. *Contemporary Educational Technology*, 9(4), 374-389.

Hsieh, H.F. and Shannon, S.E., (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), pp.1277-1288.

Husna, F. (2016). Peran musyawarah guru mata pelajaran (MGMP) untuk meningkatkan kompetensi profesional guru PAI: studi kasus MGMP PAI SMP Negeri Kabupaten Kediri. *Didaktika Religia*, 4(2), 205-224.

Husni, E. M., & Fatulloh, A. (2016). Kategorisasi pengguna internet di kalangan pelajar sd dan smp menggunakan metode twostep cluster. In *Seminar Nasional Aplikasi Teknologi Informasi (SNATi)*.

Ilic, P. (2013). *The impact of mobile phones on collaborative learning activities*.

Indrajit, R. E., Wibawa, B., & Suparman, A. (2020). Research Spectrum Framework in the Field of Educational Technology. In *2020 Fifth International Conference on Informatics and Computing (ICIC)* (pp. 1-4). IEEE.

Indonesia, P.R., (2003). Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional.

Indonesia, B.-S. (2017). Statistical Yearbook of Indonesia 2017. In *BPS-Statistics Indonesia* (Issue 1).

Indonesia, P. K. (2017). *Rangkuman statistik pendidikan dasar dan menengah 2017/2018*.

http://publikasi.data.kemdikbud.go.id/uploadDir/isi_2B40A310-F17C-4315-AF34-1FBA51252C56_.pdf

InternetSociety.org. (2017). *Children and the Internet*. Wwww.Internetsociety.Org. <https://doi.org/10.1108/eb027638>

Ismail, I., Bokhare, S., Azizan, S. and Azman, N., (2013). Teaching via mobile phone: A case study on Malaysian teachers' technology acceptance and readiness. *Journal of Educators Online*, 10(1), pp.1-38.

Jassica.Y, M. G. K. D. C. (2016). Performance of U.S. 15-Year-Old Students in Science, Reading, and Mathematics Literacy in an International Context. *National Center for Education Statistics*.

Johnson, D. A., and Trivedi, M. M. (201, October). Driving style recognition using a smartphone as a sensor platform. In 2011 *14th International IEEE Conference on Intelligent Transportation Systems (ITSC)* (pp. 1609-1615). IEEE

Julianto, P. A. (2018). Rudiantara: 2019 Semua Kabupaten Menikmati Koneksi 4G. *Kompas*. <https://ekonomi.kompas.com/read/2018/01/04/185221126/rudiantara-2019-semua-kabupaten-menikmati-koneksi-4g>

Kastberg, D., Chan, J. Y., & Murray, G. (2016). Performance of US 15-Year-Old Students in Science, Reading, and Mathematics Literacy in an International Context: First Look at PISA 2015. NCES 2017-048. *National Center for Education Statistics*.

Kearney, M., Burden, K., & Rai, T. (2015). Investigating teachers' adoption of signature mobile pedagogies. *Computers & Education*, 80, 48-57.

Kemdiknas, D. P. M. P. dan T. K. (2010). *Prosedur Operasional Standar Penyelenggaraan KKG Dan MGMP*.

Kemendesa. (2020a). *Pusat Data Desa Indonesia*. <https://Pddi.Kemendesa.Go.Id/>. <https://pddi.kemendesa.go.id/desa?id=3201382009>

Kemendesa. (2020b). *Pusat Data Desa Indonesia*. <https://Pddi.Kemendesa.Go.Id/>. <https://pddi.kemendesa.go.id/desa?id=3201382001>

Kemendikbud. (2016a). *Guru pembelajar: Moda tatap muka, dalam jaringan (daring), dan daring kombinasi*. Direktorat Jenderal Guru dan Tenaga Kependidikan.

Kemendikbud (2016b). *Dashboard* .gtk. Retrieved April 5, 2021, from https://referensi.data.kemdikbud.go.id/dashboardgtk/ptk_dash22.php?id=20&kd=cgBqvsutE6D7IRZCVzvQHrNBdAz3PJqIj4KII5UNnTo

Kemendikbud. (2017). Laporan Kinerja, Kementerian Pendidikan dan Kebudayaan. In *Kementerian Pendidikan dan Kebudayaan Republik Indonesia*.

Kemendikbud. (2018). *Pedoman Umum Program Pengembangan Keprofesian Berkelanjutan (1st ed.)*. Direktorat Jenderal Guru dan Tenaga Kependidikan.

Kemendikbud. (2019a). Neraca Pendidikan Daerah. Kemendikbud. <http://npd.kemdikbud.go.id/?appid=ukg>

Kemendikbud. (2019b). *Sejarah Kementerian Pendidikan dan Kebudayaan. Kementerian Pendidikan Dan Kebudayaan Republik Indonesia*. <https://www.kemdikbud.go.id/main/tentang-kemdikbud/sejarah-kemdikbud>.

Kemendikbud . (2020). Dashboard .gk. Retrieved April 5, 2021, from https://referensi.data.kemdikbud.go.id/dashboardgtk/ptk_dash22.php?id=20&kd=cgBqvsutE6D7IRZCVzvQHrNBdAz3PJqlj4KII5UNnTo

Khaer, A. (2019). *Kebijakan program peningkatan kompetensi pembelajaran*.

King, H. (Ed.). (2022). *Developing Expertise for Teaching in Higher Education: Practical Ideas for Professional Learning and Development*. Routledge.

Kominfo. (2017). *Survey Penggunaan Tik: Serta Implikasinya terhadap Aspek Sosial Budaya Masyarakat*. Jakarta: Kementerian Komunikasi dan Informatika Republik Indonesia.

Kompas. (2015). *USAID Helps Distribution of Teachers in Indonesia. Acdp Indonesia*. <https://acdipindonesia.wordpress.com/2014/10/15/usaid-helps-distribution-of-teachers-in-indonesia/>.

Kristiansen, S., & Pratikno. (2006). Decentralising education in Indonesia. *International Journal of Educational Development*, 26(5), 513–531

Kristiansen, S. (2006). Decentralising education in Indonesia. *International journal of educational development*, 26(5), 513-531.

Kukulsk, A., John, A.-H., Tit, P., Kukulska-Hulme, A., & Pettit, J. (2009). *Practitioners as Innovators: Emergent Practice in Personal Mobile Teaching, Learning, Work, and Leisure*. http://oro.open.ac.uk/15502/1/07_Mohamed_Ally_book_2009-Article7.pdf

Kumar, S. (2014). Signature pedagogy, implementation and evaluation of an online program that impacts educational practice. *The Internet and Higher Education*, 21, 60-67.

Kusnandar. (2013). Pengembangan Model Pendayagunaan Teknologi Informasi Dan Komunikasi (TIK) Untuk Pendidikan Di Daerah Terpencil, Tertinggal, Dan Terdepan. *Journal of Kwangsan*, 1, 122–142.

Kuwado, F. J. (2017). *Ini Strategi Jokowi Ini Strategi Jokowi Menuju Indonesia Emas 2045*. Kompas. <https://nasional.kompas.com/read/2017/03/27/15123691/ini.strategi.jokowi.menuju.indonesia.emas.2045>.

Kusumawardhani, P.N., (2017). Does teacher certification program lead to better quality teachers? Evidence from Indonesia. *Education Economics*, 25(6), pp.590-618.

Kvale, S. and Brinkmann, S., (2009). *Interviews: Learning the craft of qualitative research interviewing*. Sage.

Lasabuda, R. (2013). Regional development in coastal and ocean in archipelago perspective of the Republic of Indonesia. *Jurnal Ilmiah Platax*, 1(2), 92-101.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

Lestari, M. (2019). Pengaruh pembangunan infrastruktur terhadap pertumbuhan ekonomi dan pemerataan ekonomi indonesia (studi pada badan pusat statistik tahun 2003-2017). *Jurnal Administrasi Bisnis*, 70(1).

Lea, J. & Purcell, N. (2015) Introduction: the scholarship of teaching & learning, the Higher Education Academy, & the UK Professional Standards Framework. In: Lea, J. (Ed.), *Enhancing learning & teaching in higher education: Engaging with the dimensions of practice*. Open University Press, Maidenhead, 1–16.

Lincoln, Y.S., and Guba, E.G (1985). *Naturalistic Inquiry*. Beverly Hills, CA: Sage.

Lisdiana, A., Handyani, D., & Ariyana, Y. (2018). *Pedoman program peningkatan kompetensi pembelajaran berbasis zonasi*.

Lampung, L. (2017). *Peta dan Analisis Mutu Pendidikan Provinsi Lampung*.

Laal, M. (2011). Knowledge management in higher education. *Procedia Computer Science*, 3, 544-549.

Lewis, J., (2009). Redefining qualitative methods: Believability in the fifth moment. *International Journal of Qualitative Methods*, 8(2), pp.1-14.

Lune, H., & Berg, B. L. (2017). *Qualitative research methods for the social sciences*. Pearson.

Luschei, T.F. and Zubaidah, I., (2012). Teacher training and transitions in rural Indonesian schools: A case study of Bogor, West Java. *Asia Pacific Journal of Education*, 32(3), pp.333-350.

Mansyur, U., & Priatna, D. (2019). *Sustainable markets development in Bogor District*. In *IOP Conference Series: Earth and Environmental Science* (Vol. 399, No. 1, p. 012118). IOP Publishing.

Mareceki (2009). *Dancing through Minefields: Toward a qualitative stance in psychology*.

Marshall, C., & Rossman, G. (2006). *The how of the study: Building the research design*. *Designing qualitative research*, SAGE.

Matthews, B., & Ross, L. (2010). *Research Methods About The Authors. A great starting point for students and would-be social researchers*; www.pearsoned.co.uk/matthews.

- Matthews, B., Ross, L., & Ellison, N. (2010). *Research Methods: A great starting point for students and would-be social researchers*. June, 10, 2010.
- Mayring, P., (2000). Qualitative content analysis, forum. *Qualitative Social Research*, 1(2), pp.43-56.
- Maxwell (1996). *Qualitative research design: An interactive approach*. London: SAGA Publications.
- McAleavy, T., Hall-Chen, A., Horrocks, S., & Riggall, A. (2018). *Technology-Supported Professional Development for Teachers: Lessons from Developing Countries*. Education Development Trust. Highbridge House, 16-18 Duke Street, Reading Berkshire, England RG1 4RU, United Kingdom.
- McConatha, D. (Ed.). (2013). *Mobile pedagogy and perspectives on teaching and learning*. IGI Global.
- Mediaindonesia.com. (2019). *Pemerintah Selenggarakan Program PKP Berbasis Zonasi*. Media Indonesia.
<https://mediaindonesia.com/read/detail/228756-pemerintah-selenggarakan-program-pkp-berbasis-zonasi>
- Mendenhall, M., (2017). Strengthening Teacher Professional Development: Local and global communities of practice in Kakuma Refugee Camp. *Promising practices in refugee education*. London, UK: Save the Children.
- Merriam, S. B. (2001). *Qualitative Research and Case Study Applications in Education*. San Francisco, CA: Jossey-Bass.
- Miao, F., West, M., So, H. J., & Toh, Y. (2017). *Supporting teachers with mobile technology*. Lessons drawn from UNESCO projects in Mexico, Nigeria, Pakistan and Senegal. Francia. Recuperado de
<http://unesdoc.unesco.org/images/0025/002515/251511e.pdf>.
- Morrow, S. L. (2005). Quality and trustworthiness in qualitative research in counseling psychology. *Journal Of Counseling Psychology*, 52(2), 250.
- Motteram, G. (2017). *Teaching and technology: Case studies from India*.
- Motteram, G., Dawson, S., & Al-Masri, N. (2020). WhatsApp supported language teacher development: A case study in the Zataari refugee camp. *Education and Information Technologies*, 25(6), 5731-5751.
- Mpho M. Dichaba & Matseliso L. Mokhele (2012) Does the Cascade Model Work for Teacher Training? Analysis of Teachers' Experiences, *International Journal of Educational Sciences*, 4:3, 249-254, DOI: [10.1080/09751122.2012.11890049](https://doi.org/10.1080/09751122.2012.11890049)
- Muhyiddin, A.H., (2012). Meluruskan Arah Pendidikan Nasional. *Alkautsar*. co.

- Murniati, A. R., Usman, N., Husen, M., & Irani, U. (2019). Teachers professional management through teachers working group in Aceh Province. *Jurnal Akuntabilitas Manajemen Pendidikan*, 7(1), 97-108.
- Naismith, L., Lonsdale, P., Vavoula, G., & Sharples, M. (2004). Literature Review in Mobile Technologies and Learning Literature Review in *Mobile Technologies and Learning*. Futurelab Series, Report 11, May 2014, 48. http://www.nfer.ac.uk/publications/FUTL15/FUTL15_home.cfm
- Naismith, L., Lonsdale, P., Vavoula, G. N., & Sharples, M. (2004). *Mobile technologies and learning*.
- Neuendorf, K. A. (2018). *Content analysis and thematic analysis. In Advanced research methods for applied psychology (pp. 211-223)*. Routledge.
- Nursyamsi, N. (2014). Pengembangan Kepribadian Guru. *Al-Talim Journal*, 21(1), 32-41.
- National, D. P. (2005). *Undang-Undang Republik Indonesia Tentang Guru dan Dosen*. Jakarta: Biro Hukum dan organisasi SekjenDepdiknas.
- National, D.P., (2005b). Peraturan Pemerintah Nomor 19 Tahun 2005. *Tentang Standar Nasional Pendidikan*.
- National, D.P., (2007). *Peraturan Menteri Pendidikan Nasional Republik Indonesia Nomor 16 Tahun 2007 tentang Staandar Kualifikasi Akademik dan Kompetensi Guru*. Jakarta: Menteri Pendidikan Nasional.
- National, D. P. (2008). Standar Pengembangan Kelompok Kerja Guru (KKG) dan Musyawarah Guru Mata Pelajaran (MGMP). *Jakarta: Direktorat Profesi Guru*.
- Nedungadi, P., Mulki, K., & Raman, R. (2018). Improving educational outcomes & reducing absenteeism at remote villages with mobile technology and WhatsApp: Findings from rural India. *Education and Information Technologies*, 23(1), 113-127.
- Nikolopoulou, K. (2020). Secondary education teachers' perceptions of mobile phone and tablet use in classrooms: Benefits, constraints and concerns. *Journal of Computers in Education*, 7(2), 257-275.
- Ngeze, L. V., Khwaja, U., & Iyer, S. (2018). Cascade model of teacher professional development: Qualitative study of the desirable characteristics of secondary trainers and role of primary trainers. In *Proceeding at the 26th International Conference on Computers in Education* (pp. 755-760).
- O'Bannon, B. W., & Thomas, K. (2014). Teacher perceptions of using mobile phones in the classroom: Age matters!. *Computers & Education*, 74, 15-25.
- Offir, B., Lev, Y., and Bezalel, R. (2008). Surface and deep learning processes in distance education: Synchronous versus asynchronous systems. *Computers & Education*, 51(3), 1172-1183.

Pachler, N., Bachmair, B., & Cook, J. (2010). *Mobile Learning: Structure, Agency, Practices*.

Parker, M., Patton, K., & O'Sullivan, M. (2016). Signature pedagogies in support of teachers' professional learning. *Irish educational studies*, 35(2), 137-153.

Patton, M.Q., (2014). *Qualitative research & evaluation methods: Integrating theory and practice*. Sage publications.

Patty, R. R. (2018). *Menkominfo: Semua Wilayah Tertinggal Akan Terhubung Internet pada 2019*. Kompas.

<https://regional.kompas.com/read/2018/03/08/21271401/menkominfo-semua-wilayah-tertinggal-akan-terhubung-internet-pada-2019>.

PDSPK Kemendikbud, I. (2018). *Rangkuman Statistik Persekolahan*. http://publikasi.data.kemdikbud.go.id/uploadDir/isi_2B40A310-F17C-4315-AF34-1FBA51252C56_.pdf

Persichitte, K. A., Suparman, A., & Spector, M. (2016). Educational technology to improve quality and access on a global scale. In *Educational Technology World Conference (ETWC 2016)* Editors: Persichitte, Kay, Suparman, Atwi, Spector, Michael (Eds.).

Picton, I. (2019). Teachers' Use of Technology to Support Literacy in 2018. *A National Literacy Trust Research Report*. National Literacy Trust.

PMPTK, D. P. N. D. (2009). *Prosedur Operasional Standar Penyelenggaraan. KKG MGMP*.

Polly, D. and Hannafin, M.J., (2010). Reexamining technology's role in learner-centered professional development. *Educational Technology Research and Development*, 58(5), pp.557-571.

Pope, C., Ziebland, S. and Mays, N., (2006). Analysing qualitative data'in Pope, C. & May, N. *Qualitative Research In Health Care*.

Postholm, M.B., (2012). Teachers' professional development: A theoretical review. *Educational Research*, 54(4), pp.405-429.

Prasetyo, R. B., & Firdaus, M. (2009). *Pengaruh infrastruktur pada pertumbuhan ekonomi wilayah di Indonesia*.

Prestridge, S. (2019). Categorising teachers' use of social media for their professional learning: A self-generating professional learning paradigm. *Computers & Education*, 129, 143-158.

Puspendik (2019). *Laporan hasil ujian nasional: Kementerian pendidikan dan kebudayaan*.

https://hasilun.puspendik.kemdikbud.go.id/#2019!smp!capaian_nasional!99&99&999!T&T&T&T&1&!1!& Date accessed march 4, 2019

Pustekkom. (2019). *Laporan kinerja tahunan pustekkom - kemendikbud 115*. http://repositori.kemdikbud.go.id/13143/1/Buku-Pustekkom-LAKIP_TAHUNAN-2018_Digital_Email-2-1.pdf

Presiden Republik Indonesia, 1 (2012).
<https://doi.org/10.1016/j.aquaculture.2007.03.021>

Putri, A., (2015). Hubungan Interpersonal Guru-Guru dalam Kelompok Kerja Guru (KKG) di Gugus 2 Kecamatan Bukit Sundi Kabupaten Solok. *Jurnal Bahana Manajemen Pendidikan*, 3(1), pp.341-348.

Ragatz, A. B., Sugiarti, S., & Iskandar, S. (2015). *Penggunaan video dalam pengembangan keprofesian guru: desain, pelaksanaan, dan evaluasi dampak dari pelatihan dalam jabatan yang inovatif bagi guru Matematika di Indonesia* (No. 106210, pp. 1-98). The World Bank.

Rahman, A. A. (2019). Decentralised Education Policy in Indonesia: Intended Outcomes and Remaining Challenges for Teachers. *Exchanges: The Interdisciplinary Research Journal*, 6(2), 30-47.

Rapih, S., & Sutaryadi, S. (2018). Perpektif guru sekolah dasar terhadap Higher Order Tinking Skills (HOTS): pemahaman, penerapan dan hambatan. *Premiere Educandum: Jurnal Pendidikan Dasar dan Pembelajaran*, 8(1), 78-87.

Rashid, A., Zeb, M. A., Rashid, A., Anwar, S., Joaquim, F., & Halim, Z. (2020). Conceptualization of smartphone usage and feature preferences among various demographics. *Cluster Computing*, 1-19.

Ravindran, S., Lau, C.Y., Lee, S.L., Yap, B.C., Goh, S.E. and Chew, C., (2021). *Developing teachers' topic-specific pedagogical content knowledge (PCK) in secondary physics*.

Redmond, Petrea; Jennifer, L. (2008). *Investigating Deep and Surface Learning in Online Collaboration*.

Redmond, P., & Lock, J. (2008, March). Investigating deep and surface learning in online collaboration. In *Society for Information Technology & Teacher Education International Conference* (pp. 4295-4301). Association for the Advancement of Computing in Education (AACE).

Retnawati, H., Djidu, H., Kartianom, A. and Anazifa, R.D., (2018). Teachers' knowledge about higher-order thinking skills and its learning strategy. *Problems of Education in the 21st Century*, 76(2), p.215.

Ridley, J.M., (2011). Teachers' continuing professional development within two clusters of small rural primary schools. National College for School Leadership, retrieved from: http://dera.ioe.ac.uk/12137/1/download%3Fid%3D1_56377.

Resmini, W. (2010). Pembinaan Kemampuan Profesional Guru Melalui Kelompok Kerja Guru (Kkg). *GaneÇ Swara*, 4(1), 59-62.

Retnawati, H., Djidu, H., Kartianom, A., & Anazifa, R. D. (2018). Teachers' knowledge about higher-order thinking skills and its learning strategy. *Problems of Education in the 21st Century*, 76(2), 215.

Saefudin, U. (2019). *Profil Gugus 08 Ciadeg*.

Scott, D., & Robin, U. (1999). Researching Education. In *Researching Education*. <https://doi.org/10.4324/9780203980361>

Schön, D. A. (1987). Educating the reflective practitioner: Toward a new design for teaching and learning in the professions. Jossey-Bass.

Setiawati, S. (2019). Analisis Higher Order Thinking Skills (HOTS) Siswa Sekolah Dasar dalam Menyelesaikan Soal Bahasa Indonesia. In *Prosiding Seminar Nasional Pendidikan KALUNI* (Vol. 2).

Shenton, A.K., (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education For Information*, 22(2), pp.63-75.

Shulman, L. S. (2005). Signature pedagogies in the professions. *Daedalus*, 134(3), 52–59. <https://doi.org/10.1162/0011526054622015>

Sia, S., & Cheriet, I. (2019). Algerian University Teachers' Disposition and Experiences in Using MOOCs for their Continuous Professional Development. In *Arab World English Journal (AWEJ)* May 2019 Chlef University International Conference Proceedings.

Silalahi, S. A., Zainal, A., & Sagala, G. H. (2022, January). The Importance of Deep Learning on Constructivism Approach. In *2nd International Conference of Strategic Issues on Economics, Business and, Education (ICoSIEBE 2021)* (pp. 243-246). Atlantis Press.

Statistics of Bogor Regency. (2020). *Statistic of Bogor Regency. 2020*. <https://bogorkab.bps.go.id/statictable/2017/05/18/9/jumlah-penduduk-kabupaten-bogor-menurut-kecamatan-.html>

Statistik, B. P. (2015). Statistical yearbook of Indonesia 2017. *Jakarta: Badan Pusat Statistik*.

Statistik, B. P. (2021). Statistik Pendidikan 2021. Jakarta: Badan Pusat Statistik.

Stake, R. E. (1994). Case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 236–247). Thousand Oaks, CA: Sage.

Stake, R. E. (1995). *The Art of Case Study Research*. Thousand Oaks, CA: Sage

Stake, R. E. (2000). Case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research (2nd ed., pp. 435–454)*. Thousand Oaks, CA: Sag

Stake, R. E. (2005). *Multiple Case Study Analysis*. New York: Gilford Publications Incorporated.

Sugiyono, Aman, Dyah.K, Sutopo, A. . (2014). *Peta jalan Pendidikan Indonesia*. State University of Yogyakarta.
<http://staffnew.uny.ac.id/upload/132304482/lainlain/buku-peta-jalan-pendidikan-indonesia.pdf>

Sukmana, Y. (2018). *Permintaan Maaf Mendikbud Setelah Para Siswa SMA Keluhkan Sulitnya Soal UNBK*. Kompas.
<https://nasional.kompas.com/read/2018/04/13/17525781/permintaan-maaf-mendikbud-setelah-para-siswa-sma-keluhkan-sulitnya-soal-unbk>

Sunandar, Sudaryanto, Sujadi, & Suherneti, N. (2008). *Pengelolaan Kualitas KKG/ MGMP*. Direktorat Pembinaan Pendidikan dan Pelatihan.

Supardan, D. (2008). *Menyingkap Perkembangan Pendidikan Sejak Masa Kolonial Hingga Sekarang: Perspektif Pendidikan Kritis*. Generasi Kampus, 1(2).

Supardi, U. . (2012). The direction of education in Indonesia, the policy level and the implementation. *Journal of Clinical Microbiology*, 2(2), 111–121.
<https://doi.org/10.1128/JCM.01679-15>

Suratno, T. (2011). *The Education System in Indonesia at a Time of Significant Changes*. *Revue Internationale d'éducation de Sèvres*, 58(décembre 2011), 12–15.
<http://ries.revues.org/2131>

Susantono, B. (2012). *Manajemen infrastruktur dan pengembangan wilayah*. Penerbit Universitas Indonesia.

Susilo, A. (2014). Using Facebook and WhatsApp to leverage learner participation and transform pedagogy at the Open University of Indonesia. *Jurnal Pendidikan Terbuka Dan Jarak Jauh*, 15(2),63-80

Susilowati, E., Taufan, M., Wahyudi, & Kurniawan, A. (2019). *Laporan Kinerja: Direktorat Jenderal Guru Dan Tenaga Kependidikan*

Thoma, J., Hutchison, A., Johnson, D., Johnson, K., & Stromer, E. (2017). Planning for technology integration in a professional learning community. *The Reading Teacher*, 71(2), 167-175.

Thomas, G. (2011). *How to do your case study (a guide for students and researchers)*. SAGE.

Thomas, K.M., O'Bannon, B.W. and Britt, V.G., (2014). Standing in the schoolhouse door: Teacher perceptions of mobile phones in the classroom. *Journal of Research on Technology in Education*, 46(4), pp.373-395.

Thomson, P., Hall, C., Jones, K., & Sefton-Green, J. (2012). *The Signature Pedagogies Project: Final Report*. Newcastle: CCE.

- Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & health sciences*, 15(3), 398-405.
- Walsh, C., Woodward, C., Solly, M., & Shrestha, P. (2014). *The potential of mobile phones to transform teacher professional development*.
- Warsihna, J., Mutmainah, S., & Utari, I. (2015). E-SABAK (Tablet) for learning in Indonesia. *Jurnal Teknodik*, 19, 293–304.
- Wickham, M. and Woods, M., (2005). Reflecting on the strategic use of CAQDAS to manage and report on the qualitative research process. *The Qualitative Report*, 10(4), pp.687-702
- Womack, J. W. (2022). *Higher Education Faculty and Reflective Practice* (Doctoral dissertation, University of Southern California).
- Word Bank. (2015). *Indonesia: Better Education through Reformed Management and Universal Teacher Upgrading. 2014*.
<https://www.worldbank.org/en/results/2014/04/14/indonesia-better-education-through-reformed-management-and-universal-teacher-upgrading>
- Vygotsky, L. S, Socio-cultural theory. *Mind in Society*, 6, 1978, pp 52–58
- Yani, A. (2006). Kebijakan Distribusi Guru Melalui Participatory Management Pada Era Otonomi Daerah. *Ejournal UPI*, 1, 47–54.
- Yani, A. (2010). Kebijakan Distribusi Guru melalui Participatory Management pada Era Otonomi Daerah. *Manajerial: Jurnal Manajemen dan Sistem Informasi*, 9(2), 47-54.
- Yaya, J. (2017). *Mapping technology ability information at primary and secondary education in indonesia*. December 2017, 31–33.
- Yin, R. K. (2014). *Case Study Research; Design and Methods*. SAGE.
- Yuliandini, N., Hamdu, G., & Respati, R. (2019). Pengembangan soal tes berbasis higher order thinking skill (HOTS) taksonomi bloom revisi di sekolah dasar: *Jurnal Ilmiah Pendidikan Guru Sekolah Dasar*, 6(1), 37-46.
- Zainuddin, M. (2015). *Reformasi Pendidikan di Era otonomi Daerah* [Universitas Negeri Malang]. <http://digilib.um.ac.id/images/2015> - Reformasi Pendidikan di Era Otonomi Daerah - Prof. Dr. Drs. Mohammad Zainuddin, M.Pd.PDF
- Zalilia, L., Ariyana, Y., Pudjiastuti, A., Bestari, R., Handayani, D., & Nuraeni, R. (2018). *Buku Pengangan Pembekalan Narasumber Nasional/instruktur Nasional/Guru Inti*.
- Zalilia, L., Handayani, D., Widayat, & Supendi, K. (2019). *Buku Manual Kelas Pendampingan Online PKP Bagi Guru Sasaran Buku Manual Kelas Pendampingan Online PKP Bagi Guru Sasaran*.

Appendix A

Letter Agreement from 08 Ciadeg TWG

1st October 2019

To whom it may concern,

SUBJECT: PERMISSION FOR OBSERVATION, INTERVIEW AND SURVEY IN TEACHER WORKING GROUP IN INDONESIA THROUGH MOBILE LEARNING

Refer to the above matter. Teacher working group has received an application from Mr Mohamad Adning, as a doctoral researcher at Brunel University London to conduct an observation, interview and survey for research through mobile learning In our teacher working group at Gugus 08, Ciadeg, Kab. Bogor for his study.

Gugus 08, Ciadeg as Teacher working group has granted permission for Mr Mohamad Adning to conduct his research in our teacher working group. The community will give the best commitment to the success of Mr Mohamad Adning research.

Information about researcher

Name : Mohamad Adning Sopyan
Position : Doctoral researcher / PhD student
Address : Chepstow hall staircase K, room 30
Brunel University London
Uxbridge, UB8 3PH, UK

Area research: mobile learning, teacher competencies and teacher working group

For any enquires and further information, you can contact us at [+685319247474](tel:+685319247474) and email to sdnciadeg02@gmail.com

Thank you

Head of teacher working group



Ujang Saefudin, S.Pd.

Appendix B

Sample of Transcript Interviewee

(Bilingual Version)

A. Demography Profile.

Q1 : Silakankan perkenalkan nama, asal sekolah dan mengajar tingkat berapa? (Can you introduce yourself (name, origin school and class level of teaching?)

NW : Perkenalkan saya NW dari unit kerja SDN Ciadeg 3 mengajar kelas 4 (My name is NW from 03 Ciadeg Primary School, I teach in grade 4).

Q2 : Bisakah Anda deskripsikan lokasi sekolah Anda dari kota Bogor, seperti jarak, akses dan letak sekolah. (Can you describe your school's location from Bogor residence, such as distance, access, and demography?)

NW : Dulu pernah dan sempat menjadi sekolah terpencil karena mungkin dilihat dari jalannya jauh dari jalan raya kemudian akses kendaraan nya juga sulit katanya tidak bisa mobil. ya sekarang kan sudah ada jalan tol yang mungkin lebih cepet setengah jam lah kalau seperti biasa mah dua jam. (In the past, this school (03 Ciadeg Primary School) is a part of the remote schools, it probably seems far from the highway and difficult to be accessed by car. Nowadays, there is a highway, so it can be faster, which is around half an hour. Before, it takes two hours)

Q3 : Apakah ada koneksi kabel internet di sekolah Anda, Jika tidak ada bagaimana dengan koneksi internet di handphone. (Is there any internet cable connection in your school? If not, what about the cellular connection in your school ?)

NW : *Belum ada, hanya pakai wifi sendiri ehh data internet.* (Not Yet, I use my own WIFI through packet data)

Q4 : *Dapatkan Anda deskripsikan lokasi rumah Anda dan seberapa jauh dari sekolah termasuk demografi lokasi dan jarak dan akses ke rumah Anda.*
(Can you describe your home location from your school, such as demography, distance, and access to your home?)

NW : *Dekat, domisili saya disana sekitar 100 meter* (It's near, my house is around a hundred meters from here (03 Ciadeg Primary School)).

Q5 : *Apakah ada koneksi kabel internet di rumah? Jika ada, bagaimana kondisi jaringannya? Jika tidak ada, bagaimana dengan koneksi selular.*
(Is there any internet cable connection at home? If the answer is yes, how is the condition of the connection at home? If the answer is no, what about the cellular connection at home?)

NW : *Hanya data selular saja, sedangkan dirumah sinyalnya bagus dan saya hanya menggunakan provider tertentu saja yang saya pakai.* (Only cellular connection in my home and good connection even though I use some cellular companies).

B. Habitual Action Through Mobile Technology:

Q6 : Perangkat apa yang ada digunakan untuk mencari informasi, pengetahuan dan keahlian untuk kegiatan keseharian seperti laptop, tablet handphond dan personal computer. (Which device do you use to search for information, knowledge, skills and learning in daily activities e.g.laptop, tablet, mobile phone, or personal computer)

NW : Saya menggunakan HP (handphone), sedangkan untuk aplikasi untuk mencari yang paling banyak tentunya Google. (I use mobile phone, meanwhile for search information mostly use Google)

Q7 : Saluran apa yang Anda gunakan untuk berbagi informasi, pengetahuan, kemampuan dan belajar di dalam aktivitas keseharian seperti berbagi di tatap muka, kelompok temu, kelompok online, secara online. (Which channel do you use to share your information, knowledge, skills and learning in daily activities such as face to face, group meetings, online group meetings, online share)

NW : Jika secara online tentunya dengan HP melalui media social salah satunya WhatsApp. Saya ada facebook juga dan di hanya untuk berbagi share/berbagi foto kegiatan saja. (If doing by online, I use a mobile phone through one of the social messaging apps, namely WhatsApp. I have Facebook and use it to share pictures of my activities)

Q8 : Apa fungsi utama dari mobile phone Anda selain untuk berkomunikasi seperti membaca berita, belanja online, tranportasio online. (What is the main function of your mobile phone besides communication, such as news reading, online shopping, transportation ordering?)

NW : Biasanya cari infomasi, bisnis online, tranportasi tapi jarang. (Usually, I use it to search for information, online business and transportation access, though it is rare)

Q9 : Apakah ada fungsi lain dari mobile phone ada untuk berbagi dan mengajarkan kepada rekan guru atau kolega Anda. (Is there a feature on your phone that you can share and teach a peer or colleague?)

NW : Tentu saja iya, mobile phone melalui media social salah satunya WhatsApp. (Sure, I use mobile phone with social media one of them is WhatsApp)

Q10 : Jika di ranking dari 1 sampai dengan 5, kemampuan Anda menggunakan mobile phone berada di angka berapa? (If it is 1 to 5 to rank yourself in capability to use mobile phone, which number are you?)

NW : 4 mungkin (Probably number 4)

C. Knowledge of HOTS Before, During the Course and After the Training Programme Connected to Mobile Technology Activities.

Q11 : Apakah Anda sudah mengetahui konsep HOTS sebelum program di mulai? Jika jawabannya ya, dari mana Anda mengetahui hal tersebut. (Do you know the concept of HOTS before the programme? If the answer is yes, where do you know about that?)

NW : Sebelum mengikuti pelatihan PKP berbasis zonasi, di KKG pernah dibahas oleh Pak Pangkat dan narasumber yang lainnya. Tetapi, belum mendalam sekali karena KKG hanya 8 pertemuan. Tidak ada praktik juga. Hanya transfer pengetahuan saja. Jadi, pernah tapi tidak terlalu mendalam. (Before I join the NTP, in TWG it already discuss through Mr. Pangkat and other speaker, but the discuss is not in depth and without practice too. It's only transfer of knowledge. So it's not in depth to discuss)

Q12 : Ketika akan memulai pelatihan, apakah Anda mencari dan melihat program ini seperti apa?, Jika iya, dimana dan bagaimana Anda mencarinya? (When you started the programme, did you search and look what the programme was? If the answer is yes, where and how did you search?)

NW : *Iya, cari tau dulu lewat google kemudian di facebook juga ada semacam grup gitu. Di dalamnya guru dari berbagai pelosok daerah. Ada juga guru-guru yang membahas PKP, sehingga saya lihat komentarnya. itu didalamnya terdapat guru-guru. Saya mencarinya melalui HP. (Yes, I'm looking through google and facebook. There is a community on facebook from around Indonesia. There is teachers discuss the NTP, I looked the comment and search through mobile phone).*

Q 13 : Selama pelatihan berlangsung, perangkat elektronik apa yang Anda gunakan untuk mencari dalam pengetahuan untuk meningkatkan ketrampilan Anda? (During the training session, what device did you use to search for the knowledge to improve your skills?)

NW : *Kebanyakan menggunakan mobile phone karena lebih praktis dan lebih mudah untuk mengakses. Saya menggunakan google, youtube. Kalau ada yang tidak mengerti/saya lupa, saya langsung mencari melalui google atau youtube. (I mostly use my mobile phone. It's simple, convenient, and easy to access. Of course, Google and YouTube can help me. Directly, if there is content or material that I forgot.)*

Q14 : Apakah ada aktivitas lain dengan menggunakan HP selama pelatihan dan kenapa? (Were there any activities that you used on your mobile phone during the session?)

NW : *Tentu ada yaitu komunikasi dan saya juga melakukan bisnis online beberapa kali selama sesi kelas (For sure, I was communicated with someone and sometimes I did my online business during the session)*

Q15 : *Aktivitas apa yang Anda gunakan melalui HP dalam mendukung proses pembelajaran tersebut? (In what kind of activities did you use mobile phone to support your learning?)*

NW : *Mencari dan chat. Paling banyak untuk mencari materi melalui google/youtube. Kebanyakan GI memberikan modul berupa PDF. Saya terkadang mempelajari melalui youtube juga sehingga dapat lebih mudah untuk dipahami. (Searching and chatting. I mostly search contents on Google or YouTube. Core techers generally are giving content with PDF files. In add moment, I also search and learn through YouTube so that It can be easily to understand and learn)*

Q16 : *Sumber belajar apa yang ada digunakan di dalam HP untuk mendukung informasi dan pengetahuan terkait dengan materi? (What learning sources did you use on the mobile phone to support information related to knowledge content?)*

NW : *Youtube dan Google. Selain itu, Facebook melalui forum guru banyak juga yang membahas PKP zonasi. Saya search dan amati komentar-komentar dan saya amati kegiatannya apakah sama atau tidak. (YouTube dan Google. Beside that there is teacher forum on Facebook which talk about the NTP. I searched and looked the comment is there any similarly or not)*

Q17 : *Apakah Anda melakukan perekaman video, audio atau mengambil photo selama pelatihan dengan Hp untuk mendukung pembelajaran? Jika ya, mengapa Anda melakukan hal tersebut? (Did you record a video, audio or picture during the training by the mobile phone?) Phone to support the learning process? Why did you do that?*

NW : *Tidak (No)*

Q18 : Apakah Ada kemandirian dalam belajar untuk mencari pengetahuan tentang HOTS selama pelatihan? (Was there any self-independence to look for knowledge of HOTS during the training?)

NW : *Tentu, selain dari narasumber, saya mencari materi melalui mobile phone pasti. Kalau saya kurang mengerti, saya cari tahu sendiri lewat google dan youtube. (Sure, Beside the knowledge from core teacher. I search content through mobile phone, for sure. If I don't understand. I'am search through Google and YouTube)*

Q 19 : Selepas pelatihan selesai dan sebelum ujian. Apakah Anda membaca kembali materi yang ada? Jika jawabannya Ya, perangkat elektronik apa yang Anda gunakan untuk membaca tersebut? (After finishing the training, and before the assessment, do you re-read your content? If the answer is yes, on what device did you read that?)

NW : *Tentu karena sudah hampir beberapa minggu terlewat, jadi saya baca-baca kembali dari awal kegiatan PKP hingga soal-soal post-test yang diberikan oleh GI. Kebanyakan melalui mobile phone. Karena soal-soal postestnya GI mengirimkan via mobile phone. Yang kedua, Selain itu, saya sering belajar dari YouTube juga karena GI kirimnya satu atau dua paket. (Of course, after a couple of weeks, this programme ended. I re-read content from the beginning of the programme to the post-test questions given by the core teacher. Mostly, I use it on my mobile phone. Frequently, I learn from YouTube because my core teacher sent me a couple of packets of test questions)*

Q 20 : Apakah Anda mengimplementasikan ketrampilan HOTS di dalam kelas? Bagian mana yang Anda implementasikan di kelas? (Do you implement your skill of HOTS in your class? which part of it do you implement in your class?)

NW : *Ya, beberapa bagian saja (Yes, a couple of part)*

Q 21 : Apakah Anda merasa percaya diri selepas mengimplentasikannya keahlian pendekatan HOTS Anda? (Do you feel more confident after implementing the skill of HOTS?)

NW : *InsyaAllah lebih percaya diri. (I'm confident)*

Q 22 : Apakah Anda merasa perca diri ketika membagikan pengetahuan tentang pendekatan HOTS kepada rekan sejawat Anda? Melalui saluran apa Anda berbagi biasanya? (Do you feel more confident when you share your knowledge of HOTS to your colleagues?)

NW : *Tentu. Saya juga ada teman sejawat di SD yang sedang PKP sekarang. Jadi, kita saling berbagi ilmu. Apa yang saya mengerti, saya bagi ke mereka. Kebanyakan menggunakan HP melalui grup chat WhatsApp. (Of Courses. I have a colleague from my school who is currently join the dissemination programme. Thus, I share knowledge with her. What I am understand and shared with them. Mostly I used mobile phone through WhatsApp group)*

Q 23 : Apakah Anda melakukan modifikasi terhadap materi yang Anda miliki ketika membaginya kepada rekan sejawat Anda di sekolah? (Did you modify the previous material or content when you shared it with your colleagues at school?)

NW : *Tidak, saya duplikasi saja dari PKP yang sebelumnya. Saya tidak menambahkan kometar. (No, I just duplicated the previous programme. I didn't add any comments)*

Q 24 : Apakah Anda mendapatkan dukungan dari kepala sekolah atau pemangku kebijakan lainnya untuk membagi pengetahuan pendekatan HOTS. Jenis dukungan apa yang diberikan? (Did you get support from the head teacher or other stockholders to share your knowledge of the HOTS approach? What type of support is provided?)

NW : *Alhamdulillah, bapak kepala sekolah selalu mendukung. Kami sebetulnya semua digiring ke kegiatan PKP. Jadi, di sekolah hanya tinggal sedikit. Kepala sekolah mengizinkan dan mendukung kegiatan ini supaya lebih mandiri dan ilmunya juga lebih bertambah. (The headteacher has always been supported. We were actually led to the programme. Thus, in school, only a few remained. The headteacher permits and supports these activities in order to be more independent, and our knowledge is increased)*

Q 25 : *Apakah ada fungsi lain yang dilakukan melalui mobile phone untuk berbagi mengajar dan belajar kepada rekan sejawat Anda? (Are there any function that you used through the mobile phone to share teaching and learning with your colleagues?)*

NW : *Telepon dan chat WhatsApp itu saja karena mereka tidak punya aplikasi lain. (Call and chat on WhatsApp, that's all. They don't have any other applications)*

Q 26 : *Apakah Anda pernah membagi tentang aktivitas pelatihan ini? Apakah ada komentar dari yang di bagikan? (Did you ever share around this training activity? Are there any comments from those you shared?)*

NW : *Kebanyakan berupa foto, video kegiatan saya. Terutama di FB. Kalau Instagram dan twitter belum. Iya, ada yang komentar dari rekan guru lain di Kecamatan Cigombong. Seperti menanyakan kegiatannya bagaimana, kemudian saya jelaskan. Mereka juga memotivasi, memberikan semangat supaya cepat selesai, supaya bisa berbagi ilmu. (Most of those are photos, videos of my activities. Specifically on Facebook, but not yet on Instagram or Twitter. Yes. There are comments from other teachers on the Cigombong District. They asked what the activities were, then I explained. They also motivate me by giving me encouragement to finish fast. So I can share it to them)*

Q 27 : Apakah ada rekan sejawat Anda berkomunikasi melalui HP terkait dengan materi HOTS? (Is there any colleague or friend who communicates via HP regarding the content of HOTS?)

NW : *Iya, ada yang satu sekolah, kadang kami lewat telepon karena kalau lewat chat WhatsApp kadang kurang jelas, jadinya lewat telepon* (Yes, that is from my colleague at school. Sometimes each of us is calling because if we use chat on WhatsApp, it is not clear. So we are calling each other)

Q 28 : Apakah menurut Anda Hp membantu memberikan pengetahuan tentang HOTS sebelum dan sesudah pelatihan? (Do you think the mobile phone helps provide knowledge of HOTS before and after your're the training?)

NW : *Ya, sangat berguna.* (Yes. It's very useful)

Appendix C

Transcript Focus Group Discussion

(Bilingual Version)

Q1 : Perangkat apa yang paling sering digunakan untuk mencari informasi pengetahuan keterampilan terkait kehidupan keseharian? (What device are you most often used to search for information, knowledge and skill for your living?).

AR : *Paling sering pakai handphone, karena ada digenggaman dan lebih mudah bu (Most frequently use mobile phone, because it handy hand and easy to bring, mam).*

EC : *Pakai handphone (Mobile phone)*

NK : *Paling seringnya pakai handphone karena paling dekat dengan kita, dan ada digenggaman kita. selalu terbuka jika dibandingkan dengan laptop ada jeda buka dulu, aktifkan dulu kalau di handphone kan kita aktif terus dan datanya juga nyala terus terbuka terus dengan ke google nya bisa langsung. Jadi lebih enak pakai handphone untuk mencari informasi (Most of the time, I use a mobile phone because of its closeness with me than the is in my hand. It is always opened when I compare it to a laptop while there is still time to open and prepare. The mobile phone is always ready to be used, and I can directly go to Google website to search for information, so I feel homey to use mobile phones.).*

Q2 : Apakah handphone Anda selalu ada paket datanya (Does your mobile phone always have packet data internet?).

NK : *Selalu, selalu ada paket data di handphone saya, bisa mati gaya kalau tidak punya paket data (Always, 'I always have data packet in my mobile phone, unless we cannot do anything, I am as dead as a dodo).*

NW : *Handphone saya selalu ada paket datanya (My mobile phone always has a data package).*

SSC : *Jadi galau jika tidak ada paket datanya (It is very distraught if there is no data package in my mobile phone).*

NK : *Benar, handphone sudah menjadi sahabat akrab dalam kehidupan keseharian (That's true, mobile phones have become close friends in daily activity).*

Q3 : Apa fungsi utama dari handphone yang bapak ibu miliki selain komunikasi dengan orang lain atau grup ? (What is the main function of your mobile phone that you are use besides to communicate with other people?).

EC : *Mencari informasi yang paling banyak (Mostly, I search for information).*

NW : *Mencari informasi (Searching information).*

NK : *Ketika pembelajaran, kita mengalami kesulitan, kadang-kadang kita juga sulit mencari buku sumber maka lebih mudah, paling cepat pakai google di handphone (When the process of learning is going on in the classroom. I have a problem with the content and have a hard time finding a sourcebook. The way to solve it fast and easily is via Google in mobile phones).*

Q4 : Apakah ada selain mencari informasi, misal mencari alat transportasi, berjualan dengan menggunakan aplikasi di handphone? (Is there anything else than looking for information that you may do, such as searching transportation, selling product through a mobile phone or other?).

SC : *Maksudnya dengan menggunakan aplikasi (Did you mean by use application?).*

NK : *Jarang sih, soalnya daerah kita ini transportasi online nya terbatas dan susah, terbatas, jadi meskipun kita punya aplikasinya, kita mau cari gak ada yg nyangkut (It's rare because in our area are limited and difficult to access transportation apps. even though we have that application, but hard to reach the online that apps).*

Q5 : Kendala apa yang yang terjadi pada aplikasi yang ada, umumnya (What is the obstacle of that application, majority?).

NW : *Mungkin sinyal juga, factor sinyal juga, sulit kalau kita mau pakai (Probably is signal, the signal factor is hard to used it).*

SSC : *Penyediannya juga mungkin agak jauh (the provider or tower is far from the area).*

AR : *Sinyal (signal).*

NK : *Ya mungkin sinyal, jadi sulit kalau kita mau pake (I thing is signal, so is hard to use).*

Q6 : Apakah ibu bapak suka belanja online melalu handphone dan seberapa sering? (Do you like shopping online via mobile phone and how often it is?)

SSC : *Kalau saya jarang jarang (for me, it's rare).*

NW : *Kalau saya pemilik usaha online, merupakan pekerjaan sampingan saya untuk mendapatkan tambahan. oleh karena itu saya menggunakan mobile phone untuk jualannya (I have my own online business. that's job is a side job for extra money. therefore, I use mobile phone for selling and business).*

NK : *Secara gari besar penggunaan handphone untuk mencari berita, transportasi tapi ada kendala sinyal, belanja online (Broadly view, I use mobile phone for searching news, transportation online even there is an obstacle and online shopping).*

Q7 : *Bagaimana dengan informasi yang terkait dengan kegiatan belajar, informasi apa yang di cari? (How about information related to learning activities, What information are you search?).*

NW : *Biasanya lagu-lagu. Biasanya di kelas, ada lagu-lagu yang sesuai dengan buku tema, saya mencari di youtube terus sambung ke speaker dikelas, Hal ini untuk menarik perhatian siswa. Kalau di spekar handphone tidak terdengar suaranya maka menggunakan speaker (Usually, I'm searching songs. Normally*

in the class, there are songs relative to the themes of the book. I'm searching on youtube and connecting to speakers in the class. This is to draw the attention of students. If I use a handphone speaker, is hard to hear for students, that's why I use speaker class).

SC : *Materi juga (content material too)*

NK : *Materi juga, cuman paling yang sulit itu pelajaran bahasa sunda, misalnya pupuh, kitakan tidak hapal, karena daripada salah cari di google. Saya menggunakan google dari pada salah terutama dari daerah lainnya. (The content material too, but the most difficult is the Sundanese language lesson, For instance, word 'Pupuh', I don't remember that rather than make a mistake, I search on Google. Thus I used google to find it).*

SSC : *Terkait dengan materi pembelajara sih untuk menarik perhatian siswa (related to subject matter for draw attention for students).*

Q8 : *Aplikasi apa saja yang tertanam di handphone bapak ibu dan aplikasi apa yang sering di gunakan? (What applications are installed on your mobile phone and which applications are often used?).*

SC : *WhatsApp (WA)*

NK : *WhatsApp (WA),*

SSC : *WhatsApp, karena biasanya langsung di baca. Klu di whatsapp pesan langsung dibaca, dan jika ditaruh di group bisa langsung tersebar (WhatsApp, because directly to read. If sent through WhatApp the message is read immediately, and if we put in a group it can be spread immediately).*

EC : *WhatsApp group (WhatsApp group)*

NW : *WhatsApp and Facebook.*

Q9 : *Bagaimana dengan media sosial? (How about social media?).*

AR : *Facebook, Instagram.*

SC : *Facebook, Instagram, WhatsApp.*

NW : *Facebook, Instagram, Telegram dan WhatsApp*

Nia : *Twitter jarang digunakan (I'm rarely used Twitter).*

EC : *Facebook, sama saja dengan aplikasi WhatsApp (Facebook, same like the WhatsApp application).*

SSC : *Sekarang sudah kalah dengan WhatsApp (at present everything uses WhatsApp).*

Q10 : *Bagaimana mencari hiburan dengan menggunakan handphone? (how about for search entertainment in mobile phone?)*

NW : *Saya menggunakan YouTube (I use YouTube).*

AR : *YouTube.*

NK : *YouTube.*

SSC : *YouTube.*

EC : *Youtube.*

Q11 : *Aplikasi apa yang digunakan untuk diskusi personal atau grup? (What Application are you used for discuss and personal chat?).*

AR : *WhatsApp group.*

NK : *WhatsApp.*

SSC : *WhatsApp.*

NK : *WhatsApp.*

EC : *Saya membuat group dengan WhatsApp (I formed a WhatsApp group).*

SC : *WhatsApp.*

Q12 : *Bagaimana dengan Facebook ada grupnya? (How about Facebook group?)*

AR : *Ada, iya dengan Facebook (Yes, I used Facebook).*

NK : *Iya ada group Facebook (Yes, I have group on Facebook).*

EC : *Dulu iya tapi sekarang jarang, tapi sekarang lebih ke WhatsApp (In the past yes, but now is rarely used, I frequently use WhatsApp).*

Q13 : *Bagaimana dengan Line grup, telegram, emailing list, Masih dipakai atau tidak? (How about Line grup, telegram, emailing list are you still used or not).*

SSC : *Line, instgram dan telegram jarang di pakai. (it's rare use Line, Instagram and telegram).*

AR : *Saya juga (Me too).*

NK : *Saya jarang pakai (I'm rare to use that).*

Q14 : *Kenapa Anda menggunakan WhatsApp? (Why are you use WhatsApp?).*

SSC : *Kalau di whatsapp kan pesan langsung dan cepat dibaca, langsung dibaca oleh group (If use WhatsApp, the message can directly to read and sent to group to).*

Q15 : *Jika dikaitkan dengan proses pembelajaran, dalam hal apa bapak dan ibu menggunakan handphone di sekolah? (If connect to learning in the class, in what aspect are you use mobile phone?)*

SSC : *Biasanya tentang materi saja sih, materi pembelajaran yang kita kurang mengerti atau kurang bisa, bisa cari informasinya di handphone (Usually, it's about the topic or subject matter. if there is a topic that I don't understand and I don't know. Mostly I search through mobile phones).*

AR : *Dalam hal sumber belajar, mencari materi untuk dikelas. terkadang sumber untuk mengembangkan materi melalui handphone. Sebagai contoh, misalkan anak ada yang bertanya, tapi materinya tidak ada terkadang dari pada lama mencari tentang materinya dan kurang kita mengerti kita bisa cari informasi dan sumber belajar dari google (In terms of learning resources, I'm looking for material for the learning process in the class. Sometimes, I develop the subject*

matter from the mobile phone. For instance, when students ask, but the material is not on the book. So immediately searching that information through google on a mobile phone).

SSC :*Kalo di depan anak kita jangan kelihatan cari cari informasi dan materi di handphone. Guru itu harus selangkah lebih maju dari anak anak. Jadi kita harus lebih kreatif lagi (In front of the class, we don't show that we are looking at something information or knowledge through mobile phones but we must step ahead of the students, So we have to be more creative).*

Appendix D

Participants Score on Attitude Aspect in the NTP on the Cigombong District from Core Teachers

No	Initial	ATTITUDE SCORE*)												Final score on attitude
		IN-1		IN-2		IN-3			IN-4			IN-5		
		Discipline	Active	Discipline	Active	Discipline	Active	Creative	Discipline	Active	Creative	Discipline	Active	
1	ID	95	95	95	95	95	95	95	95	95	95	95	95	95
2	LH	90	85	90	85	90	85	90	85	90	85	90	85	88
3	TW	95	95	95	95	95	95	95	95	95	95	95	95	95
4	AR	95	95	95	95	95	95	95	95	95	95	95	95	95
5	SS	90	85	90	85	90	85	90	85	90	85	90	85	88
6	SSC	95	95	95	95	95	95	95	95	95	95	95	95	95
7	DH	95	95	95	95	95	95	95	95	95	95	95	95	95
8	MR	95	95	95	95	95	95	95	95	95	95	95	95	95
9	DL	90	85	90	85	90	85	90	85	90	85	90	85	88
10	EC	90	85	90	85	90	85	90	85	90	85	90	85	88
11	II	90	85	90	85	90	85	90	85	90	85	90	85	88
12	RC	90	85	90	85	90	85	90	85	90	85	90	85	88
13	NW	95	95	95	95	95	95	95	95	95	95	95	95	95
14	SSS	90	85	90	85	90	85	90	85	90	85	90	85	88
15	HN	95	95	95	95	95	95	95	95	95	95	95	95	95
16	AK	95	95	95	95	95	95	95	95	95	95	95	95	95
17	NK	95	95	95	95	95	95	95	95	95	95	95	95	95
18	EM	90	85	90	85	90	85	90	85	90	85	90	85	88
19	SC	90	85	90	85	90	85	90	85	90	85	90	85	88
20	VS	95	95	95	95	95	95	95	95	95	95	95	95	95
Average score on attitude aspect														91,625

Appendix E

Participants Score on Skill Aspect in the NTP on the Cigombong District from Core Teachers

(Please see next page for the Appendix Table)

No	Initial	Course work (skill score)										Avarage score on coursework (70%)	Score KS/PS* ON (30%)	Score Total** (100%)
		LK Unit-1	RPP Unit-1	Intrumen telaah RPP Unit-1	LK Unit-2	RPP Unit-2	Intrumen telaah RPP Unit-2	Jurnal mengajar Unit-1	Refleksi Unit-1	Jurnal mengajar Unit-2	Laporan Best Practice			
1	ID	85	85	85	85	85	85	85	85	85	85	59,5	27	87
2	LH	85	85	85	85	85	85	85	85	85	85	59,5	27	87
3	TWI	85	85	85	85	85	85	85	85	85	85	59,5	27	87
4	AR	90	90	90	90	90	90	90	90	90	90	63	27	90
5	SS	85	85	85	85	85	85	85	85	85	85	59,5	27	87
6	SSC	90	90	90	90	90	90	90	90	90	90	63	27	90
7	DH	85	85	85	85	85	85	85	85	85	85	59,5	27	87
8	MR	90	90	90	90	90	90	90	90	90	90	63	27	90
9	DL	85	85	85	85	85	85	85	85	85	85	59,5	27	87
10	EC	85	85	85	85	85	85	85	85	85	85	59,5	27	87
11	II	85	85	85	85	85	85	85	85	85	85	59,5	27	87
12	RC	85	85	85	85	85	85	85	85	85	85	59,5	27	87
13	NW	90	90	90	90	90	90	90	90	90	90	63	27	90
14	SSS	85	85	85	85	85	85	85	85	85	85	59,5	27	87
15	HN	85	85	85	85	85	85	85	85	85	85	59,5	27	87

16	AK	90	90	90	90	90	90	90	90	90	90	63	27	90
17	NK	90	90	90	90	90	90	90	90	90	90	63	27	90
18	EM	85	85	85	85	85	85	85	85	85	85	59,5	27	87
19	SC	85	85	85	85	85	85	85	85	85	85	59,5	27	87
20	VS	90	90	90	90	90	90	90	90	90	90	63	27	90
Skill avarage score												60,73	27	87,73

Appendix F

Sample of Observation Result in Activity on the NTP

Observation Note

Activity : In-service training on the NTP

Date : October 5th, 2019

Location : 01 Cigombong Primary School

No	Time	Topic	Activity	
			Core teacher/ education local government/Fasilitator	Participants/teacher
1	08.00-09.00	The policy of zoning program (Kebijakan program PKB melalui PKP berbasis zonasi (Ade Abdus Shomad)	Mr Ade Abdus Shomad doing a presentation using the laptop, LCD projector. He talks about topic policy program zoning. He took the slides out of the LMS. He giving describes who can join this program. Moreover, he describes why this program important for teachers. The speaker speak around a hours.	Participants are listening to the topic from the speaker. However, some teachers playing mobile phone during the speaker talks. Asep is taking a photo of the slide presentation on the mobile phone.
		Break time		

2	09.15-11.00	Integration PPK and GLN in learning process based on High Order Thinking Skills (HOTS) Penerapan PPK dan GLN/GLS di dalam pembelajaran	<p>Core teachers Early of a session, the core teacher taking action to split the participants/teachers into several groups. Each group has 5 persons and should choose one of them as the leader.</p> <p>Fasilitators: they're giving some medium to write such as a marker pen, paper post it, and flip chart paper.</p> <p>Core teachers; He instructs teachers to write down the activity of the concept that is related to the PPK and GLN tasks in the class that the teacher did in the lesson and write it down on a paper post-it. Teachers have to distinguish information about PPK activity, and which one is GLN. Further, he is giving time to teachers to thinking.</p> <p>Next steps, core teacher ask the teacher to share the notes and share to others member in groups and separate which one type of GLN, after that put in flipchart paper to be</p>	<p>Teachers have split themselves up. The core teacher further advised them not to choose a close friend or the same school</p> <p>Teachers start writing in post-it note, I saw some teachers use the mobile phone to find PPK and GLN knowledge such as Dea looking information through the mobile phone.</p> <p>Teachers start to discuss and share the notes, some members start to draw something in flip chart papers. I sae diah open mobile phone and finding information connect PPK and GLN knowledge and find picture</p>
---	-------------	--	---	--

			<p>presents to other groups. He is giving time to discuss this knowledge.</p> <p>Core teacher is round to each group and ask is there any problematic.</p> <p>Each group has been presenting this topic with a flipchart paper for around 5 minutes (what they did in the classroom to inform understanding about knowledge of PPK and GLN)</p> <p>At the end of the presentation, each group receives a question or suggestion that includes motivation by giving applause and motivation to the other members that they have done with PPK and GLN.</p> <p>After group presentation, core teacher presents the material with topic GLN and PPK.</p>	<p>to be draw in flip chart for presentation group.</p> <p>Teachers collaborated with other members and split the task.</p> <p>Dea uses the mobile phone to search for information to get data.</p> <p>Siti solihat (srogol) is looking for a picture (tree) of just the reference to draw in a flipchart.</p> <p>Some members of the groups take pictures of their own group presentations as a document.</p> <p>some teachers take notes and listens to what the groups are presenting.</p>
--	--	--	---	---

			Core teacher promise that all material or subject will deliver in group WhatsApp or using flash disk to participants	
3	11.00	<p>Kelas pendampingan On-line</p> <p>The aim this program is giving brief knowledge about learning management system for this program.</p>	<p>This session presents the teacher to a system of learning management.</p> <p>Core teacher ask the participants to open the laptop and sign in into the apps.</p> <p>Moreover, there are facilitator to help teachers in this activity such as help connect networking to laptop</p> <p>Core teacher describes a brief about LMS what teachers will do in this system such as download, upload the task, find the learning unit and other materials.</p> <p>The first step is participants sign in. The second step is explore LMS by looking content such as learning unit, task, etc.</p> <p>Core teacher is using laptop and LCD projector to sign in and explore the LMS.</p>	<p>Teachers are starting to open laptop and starting to sign in on the application.</p> <p>However, some teacher little bit complains about internet connecting in the school. Half of the participants cannot sign in.</p> <p>Even though the facilitators are trying to connect to the WIFI on a school connexion, they still cannot connect.</p> <p>Some teacher initiative to use mobile phone as tethering the connection and share the connection to other members in the group such as siti sholihat (ciadeg) tethering to Endi.</p> <p>In addition, Siti Sholihat (srogol) get help from members of the</p>

			<p>However, core teacher cannot sign in LMS because of networking of internet school or maybe have problem.</p> <p>Core teacher suggests the members' collaboration to help each other to open the application. However, if teachers cannot open in this moment they can do it later in house.</p> <p>Some teachers seem to have a network problem and are unable to download materials using a laptop, so the core teacher has the initiative to say that all manual books (how to upload, download) and slide themes would be sent to the WhatsApp group (see WhatApps group). Before the break, core teacher suggests not to sign out for the teacher that already sign in.</p> <p>There is something to do in the on-line system, such as course work one and two must be upload in LMS during in-service training one to in-service training two. A teacher does not do this will recognise by systems.</p>	<p>group (Heni) to connect to the internet on a laptop.</p> <p>The initiatives of the Mia and Dea Group use one mobile phone as tethering to all members of the group so that they can use a laptop to connect to the LMS.</p> <p>Several teachers are trying "sign in" through mobile phone, the result is they can do by mobile phone.</p> <p>Teachers are listening to the topic from the core teacher.</p>
	12.00-12.45	Break		

4	13.00-15.00	Pre-test activity by fill in self-introduction form	<p>This session is fill in Self-introduction form. The purpose of this is to measure of knowledge about pedagogies competences and hots knowledge They form should be download from LMS, however, not all teachers can download so core teacher distributes by flash disk.</p> <p>After they have completed the fill-in form, they must upload it to LMS, but they can do it at home or at school later. Another alternative that the core teacher suggests putting this form into WhatsApp's group and core teacher will help upload this form to each teacher LMS.</p>	<p>Participants open the laptop and starting to fill in the form through laptop.</p> <p>There are share the self-introduction form using flash disk.</p>
		Concept and deeper of HOTS		
		Konsep dan pendalaman materi pembelajaran berorientasi HOTS (learning unit one)	<p>Core teacher explains the concept and sharpens of HOTS-oriented learning topics.</p> <p>Before start core teacher shows learning video</p> <p>Core teacher said that HOTS knowledge had already been</p>	<p>Teachers are listening to the topic from the core teacher. Several teachers make notes and writing in the paper. The laptop still open but teachers are concert to the speaker However, some teachers playing mobile phone during the speaker talks.</p>

			<p>discussed in each of the activities of the teacher's working group. This is only a reminder of previous knowledge. Core teacher said that we know there are three, namely LOTS, MOTS and HOTS. Now, however, we only use two knowledge, LOTS and HOTS. In addition, the core teacher explains what High Order Thinking Skills (HOTS) and Low-Level thinking skills (LOTS) are.</p> <p>The core teacher said for this power point will deliver later but not clear how and when the deliver this content.</p> <p>Further, core teacher adds some information refer to the question from participants about course work task, LMS and including the way participants were selected.</p> <p>In brief, there are still problems with LMS and the way to selected participants but all of this it can be solved in the future.</p>	<p>Teachers are giving flash disk to core teacher to download learning unit</p> <p>When there is important knowledge in Projector slides, some teachers immediately take their mobile phone to take a photo, such as what Dea, and MIA does.</p> <p>There is question about procedure collect and upload the task in LMS</p> <p>Other question is connecting with how they are selected as participants in this training.</p>
--	--	--	--	---