

Integrated Cadastre Mapping Training through Blended Learning Method as part of Corporate University Initiative: Challenge and Opportunity in Ministry of Agrarian Affairs and Spatial Planning/National Land Agency Indonesia

Agustyarsyah, Mulyadi, Kariyono, A Yessy Christiana, Reagy Muzqufa, and Wiwiek Yuniarti, Indonesia

Keywords: human resource competency, cadastre mapping, training, blended learning, corporate university

SUMMARY

Indonesia has around 126 million land parcels and its national land registration has been carried out since 1960. The Ministry of Agrarian Affairs and Spatial Planning (ATR/BPN) has succeeded in registering 81.5 out of 126 million land parcels (64%) by 2022. The number will increase every year with the existence of massive systematic land registration (PTSL) and it is expected that all parcels to have been registered by 2025. However, one of PTSL's obstacles is the spatial land data quality obtained from PTSL projects. Furthermore, It is identified that there is a low level of survey and mapping competency among civil servants. ATR/BPN Corporate University (CorpU) was chosen by ATR/BPN as an organizational learning strategy following existing governance so that a learning organization is realized. The Directorate General of Surveys and Mapping (SPPR) in collaboration with the Center for Human Resource Development (PPSDM) has conducted integrated cadaster mapping (basic and advanced levels) using the blended learning method. The objective of the basic level training is to increase cadastral mapping skills. The advanced training focuses on the integration of measurement and mapping of land parcels with precise accuracy through photogrammetric and terrestrial methods using land office computerization (GeoKKP). The blended learning method is supported by survey and cadastral mapping learning media and modules that are integrated with the Learning Management System (LMS), assignments, and competency tests using the Computer Based Test (CBT). The results show that 2415 out of 3105 (65%) basic level mapping training participants passed but 690 participants (35%) failed. For advanced-level training, 36 out of 40 participants (90%) passed and 4 people (10%) failed. The evaluation shows that participants consisting of civil servants who work in surveys and cadastral mapping are less motivated in learning because the participants are still given routine workloads in their respective offices (the majority work in district/municipality land offices and provincial regional land offices). Moreover, learning infrastructure support (LMS server) is less stable thus disrupting the learning process. Despite several obstacles, the application of the blended learning method in support of ATR/BPN CorpU can be used to improve human resource capacity, focusing on knowledge and skills of surveys and cadastral measurements at ATR /BPN.

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Agustyarsah Agustyarsah, Mulyadi Mulyadi, Kariyono Kariyono, Christiana Agustina Yessy, Muzqufa Reagy and Yuniarti Wiwiek (Indonesia)

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1. INTRODUCTION

Indonesia has around 126 million land parcels and national land registration has been carried out since 1960. The Indonesian Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) has successfully registered 81.5 of the 126 million land parcels (64%) in 2022. The number will increase every year with the massive Complete Systematic Land Registration (PTSL) and it is projected that all land parcels will be registered by 2025. Through this first land program, the government guarantees legal certainty or community-owned land rights (BPN, 2018).

The implementation of PTSL requires 4 (four) supporting components consisting of man, material, money, and method. One of the obstacles in the implementation of PTSL is the quality of the land data from the PTSL project. It is also identified that the competence of Civil servant land surveyors within the Directorate General of Land and Spatial Surveys and Mapping needs to be improved. To overcome these problems, the ATR/BPN Corporate University (CorpU) is implemented. It is an organizational learning strategy that is following governance at ATR/BPN so that learning organization in ATR/BPN is realized. Decree of the Minister of ATR/BPN Number 777/SK-DL.02/VI/2022 concerning Grand Design ATR/BPN Corporate University explained that to achieve the vision and mission of the Ministry of ATR/BPN, the ATR/BPN needs the comprehensive strategy to develop its human resource competencies through an integrated training system so that its organizational performance increases. ATR/BPN's CorpU is chosen as a program capable of facilitating the development of integrated human resource competencies with the support of knowledge management.

Directorate General of Land and Spatial Surveys and Mapping (SPPR) Institute is one part of ATR/BPN Corporate University. Based on the Learning Roadmap Mapping (LRM) at the SPPR Institute, the following 7 (seven) positions have been assigned, including Associate Cadastral Administrator, Young Expert Cadastral Administrator, First Expert Cadastral Manager, Assistant Cadastral Manager Supervisor, Assistant Cadastral Manager Advanced, Assistant Manager Skilled Cadastral, and Beginner Assistant Cadastral Manager. To increase the competence of human resources within the SPPR, an Integrated Cadastre Mapping Training is carried out using the Learning Methodology with the composition of 10% of the learning design being structured theoretical material, 20% of learning through Social Learning, and 70% is Action Learning Projects in the workplace. This training is divided into 2 (two) series, namely Basic Level and Advanced Level with the blended learning method. The objective of the basic level training is to increase cadastral mapping skills. The Elementary Level is carried out with Independent Learning/E-Learning

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focuses on integrating cadastre survey and mapping with precise accuracy through photogrammetric and terrestrial methods using land office computerization (GeoKKP). The Advanced Level consists of 20 hours of lessons for Social Learning where participants are involved through distance learning. In addition, 70 Hours of Lessons for the Action Learning Project / Assignment Practices at the workplace (land offices). During the practical implementation, the participants will be supported by a mentor, namely the direct supervisor of the work unit (PPSDM, 2022).

2. METHODOLOGY

The research method used in this study is qualitative descriptive. The qualitative description aims to describe the nature or characteristics of a symptom, event, or event that occurred today (Jonah, 2010). This research focuses on the implementation of an accelerated program for civil service surveyors' capacity development in ATR/BPN Indonesia using blended learning methods as part of the Corporate University initiative. Research data was obtained from the participant, training implementation, and teacher evaluation. Direct observations during the training were also conducted and recorded to support the analysis. While the secondary data obtained is in the form of attendance lists of participants, as well as documentation of the participant's activities.

3. RESULTS AND DISCUSSION

3.1 ATR/BPN Corporate University

CorpU is a systematic and comprehensive Organizational Learning Program approach to support the achievement of the vision and mission of the ATR/BPN. It is part of the framework of a continuous learning process throughout the civil servant's career. The ATR/BPN CorpU strategy is not only seen from its implementation at the Center for Human Resource Development (PPSDM) but also in all Echelon I Units in ATR/BPN.

ATR/BPN CorpU applying best practices to improve the working unit's performance in achieving organizational goals. This CorpU will later become the responsibility of all levels of work unit leadership, starting from the Minister, Middle High Officials, Primary High Officials, and Administrative Officers.

ATR/BPN CorpU integrates various learning resources, processes, and human resources by improving knowledge, skills, and behavior in HR in the land offices. Competence is a person's ability to apply a set of skills, knowledge, and attitudes needed to carry out work tasks. The design and composition of learning through integrated learning activities in the land offices is 70%, collaborative learning activities in the community and technical assistance (coaching, mentoring, and benchmarking) by 20%, and independent learning activities through distance training by 10%.

The implementation of ATR/BPN CorpU requires a variety of infrastructure, strategies, and integrated systems. ATR/BPN CorpU Supporting Infrastructure is described by the ATR/BPN CorpU House model which includes Learning Solution Delivery System, Learning Solution Architecture, Knowledge Management, Learning

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Agustyarsah Agustyarsah, Mulyadi Mulyadi, Kariyono Kariyono, Christiana Agustina Yessy, Muzqufa Reagy and Yuniarti Wiwiek (Indonesia)

Infrastructure, Business Institutes, Competency Schools, Enablers, Learning Focus, and Learning Strategy Governance as shown in Figure 1 below:



Figure 1. House Of ATR/BPN CorpU (PPSDM, 2022)

To support the infrastructure of the ATR/BPN CorpU, the Directorate General of Land and Spatial Surveys and Mapping (SPPR) has an important role as a Business Institute which is called SPPR Institute. The Business Institute is a technical unit administering the tasks and functions of the ministry, namely identifying competency development needs, developing learning resources, and post-implementation evaluation of competency development programs. The CorpU's learning process involved all stakeholders in the Work Unit in ATR/BPN.

3.2 Blended Learning Method

The term Blended Learning was originally used to describe e-learning combined with additional training solutions such as job assistance, on-the-job training, or mentoring. Blended Learning generally means the application of two or more methods or solutions for learning needs.

Blended Learning allows training providers to meet learning needs in the most appropriate way for the needs of learning targets according to current situations and conditions. Blended Learning provides an alternative to classroom training that makes it possible for students who are not physically present in class to have access to learning.

According to Thorne (2003), the existence of blended learning is a response to the existence of advances in online technology with traditional learning best practices. Watson (2008) explains that blended learning is a convergence between online learning and face-to-face learning. He explicitly stated that "blended learning is learning that combines the best components of online learning and face-to-face learning" (Watson, 2008, p. 4). Moreover, Bonk & Graham (2006) defined blended learning as a combination of learning from two historically different teaching-learning process models, namely between the traditional learning system (face-to-face) and the distributed learning system (distributed learning system).

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Agustyarsah Agustyarsah, Mulyadi Mulyadi, Kariyono Kariyono, Christiana Agustina Yessy, Muzqufa Reagy and Yuniarti Wiwiek (Indonesia)

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Distributed learning systems occur because of the utilization of the extraordinary potential of electronic technology, especially computers, and the internet so that it allows anyone to learn anytime and anywhere. Khan (2005), explains blended learning from a broader perspective. He stated that blended learning is a combination of strategies to deliver the right material in the right format to the right people at the right time. Blended learning combines a variety of delivery media that are designed to complement each other and encourage an optimal learning process (Khan, 2005).

Thus, in designing blended learning, it is important to choose the right combination of delivery media in both traditional and online learning settings. Where the main focus is the occurrence of optimal learning. In addition, Khan stated that blended learning includes a combination of various activities including face-to-face in class, live e-learning, and independent learning. Everything is a combination of traditional learning (guided by a teacher/mentor), synchronous online learning, asynchronous independent learning, and structured learning based on the experience of the learner and mentor (Khan, 2005).

Blended learning has two learning settings, namely asynchronous learning and synchronous learning. Synchronous learning is a learning process that occurs simultaneously at the same time between the learner and the tutor/supervisor, although it does not have to occur in the same place (Littlejohn & Pegler, 2007). Synchronous learning consists of two types. The first type is face-to-face learning in the classroom (Smaldino, et al., 2008). Khan termed it as physically synchronous learning (synchronous physical format) (Khan, 2005). The synchronous type of direct face-to-face or physically synchronous occurs simultaneously at the same time in the same place. Examples are face-to-face learning in class, research in the laboratory, field trips, presentations, group discussions in class, and all other traditional learning methods. The second type is synchronous online), also called synchronous virtual collaboration (Staley, 2007) by using audio/video conferencing, chatting, live online learning, instant messengers, and others. Asynchronous learning is a learning activity that allows different learners to experience the same teaching material at different times and places (Smaldino, et al., 2008).

Staley (2007) classifies asynchronous learning activities into two categories, namely collaborative asynchronous (such as online discussion forums, mailing lists, e-mail, etc.) and independent asynchronous (such as simulations, online tests, searching materials, materials in the form of pdf, doc, html, videos, animations, etc.)

3.3 Efforts to Improve Competence of Human Resources in the Field of Survey and Mapping

Figure 2 shows the Integrated Cadastre Mapping Training is carried out using the 10:20:70 Learning Methodology. 10% of learning design is structured theoretical material, 20% of learning is learning through Social Learning, and 70% is learning by applying material that has been learned through Action Learning Projects in the workplace.

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Agustyarsah Agustyarsah, Mulyadi Mulyadi, Kariyono Kariyono, Christiana Agustina Yessy, Muzqufa Reagy and Yuniarti Wiwiek (Indonesia)

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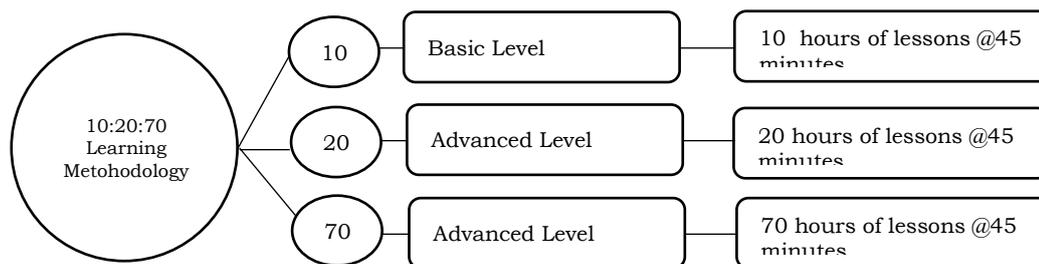


Figure 2. 10:20:70 Learning Methodology (PPSDM, 2022)

This training is divided into 2 (two) series, namely Basic Level and Advanced Level. The Elementary Level is carried out with Independent Learning/E-Learning for 10 Lesson Hours to learn the theory of the material in question. The Advanced Level is held for 20 hours of lessons for Social Learning where participants carry out distance learning together with teachers and other participants. In addition, 70 Hours of Lessons for the Action Learning Project / Assignment Practices at the workplace are also carried out, during Practical implementation the participants will be accompanied and guided by the Mentor, namely the Head of the Work Unit Directly. Below is a further explanation regarding the Basic and Advanced Level Integrated Cadastre Mapping Training.

3.3.1 Basic Level Integrated Cadastre Mapping Training

1. Purposes

The purpose of this training is to provide knowledge and skills regarding the mechanism for integrating cadastre mapping and survey (precise accuracy by applicable cadastre mapping and survey regulations). Participants in this training are civil servants of ATR/BPN. It uses Learning Management System (LMS) on www.ppsdm.atrbpn.go.id as the landing page.

2. Curriculum

Basic Level Integrated Cadastre Mapping Training Curriculum with 10 hours of lessons is implemented for 3 working days of E-Learning as shown in table 1.

Table 1. Basic Level Integrated Cadastre Mapping Training Curriculum

Days	Material	Lesson Hours
1	Overview of Training Policy	1
	Institute Substantive Technical Content	1
	Basic Concepts of Measurement Accuracy and Mapping Accuracy	
	Mindset Changes in Integrated Cadastre Mapping	1
	Level of Accuracy of Measuring Instruments, Measurement Results, and Maps	1

Integrated Cadastre Mapping Training through Blended Learning Method as part of Corporate University Initiative: Challenge and Opportunity in Ministry of Agrarian Affairs and Spatial Planning/National Land Agency Indonesia (11985)

Agustyarsah Agustyarsah, Mulyadi Mulyadi, Kariyono Kariyono, Christiana Agustina Yessy, Muzqufa Reagy and Yuniarti Wiwiek (Indonesia)

2	How to find out the Accuracy of Observation, Measurement, and Mapping Results (determining points and tolerance points)	1
	Metadata and Implications of Measurement Accuracy and Land Boundary Mapping	1
	Retrieval of Field Data, Depiction of Measurement Results, and Boundary Returns	1
3	Integration of Cadastre Measurement Result Mapping	
	Base Map	1
	Base Map Utilization	1
	Measurement Result Mapping Integration	1
Total		10

3. Implementation of Training

The implementation of Basic Level Training is divided into 6 batches as shown in table 2.

Table 2. Schedule for Basic Level Integrated Cadastre Mapping Training

No.	Batch	Participants	Implementation Date
1.	Basic Level Integrated Cadastre Mapping Training Batch I	661	25 – 28 October 2022
2.	Basic Level Integrated Cadastre Mapping Training Batch II	654	15 – 18 November 2022
3.	Basic Level Integrated Cadastre Mapping Training Batch III	681	22 – 25 November 2022
4.	Basic Level Integrated Cadastre Mapping Training Batch IV	580	29 Nov – 2 Des 2022
5.	Basic Level Integrated Cadastre Mapping Training Batch V	642	6 – 9 December 2022
6.	Basic Level Integrated Cadastre Mapping Training Batch VI	542	13 – 16 Desember 2022

The implementation of the program and the LMS can be seen in Figure 3 below:



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Agustyarsah Agustyarsah, Mulyadi Mulyadi, Kariyono Kariyono, Christiana Agustina Yessy, Muzqufa Reagy and Yuniarti Wiwiek (Indonesia)

4. Training Evaluation

The entire series of activities for participants in the Basic Level integrated Land Mapping Training batches 1-6 are carried out using the PPSDM Learning Management System (LMS) platform. The learning experience of the basic level training participants has been well structured so that the participants can obtain knowledge easily and measurably. Participants must complete the entire series of activities to be able to take the competency test and complete the Basic Level Integrated Cadastre Mapping Training. To pass the training, participants should get a score minimum of 70.00. The number of participants who passed and failed the Basic Level Integrated Cadastre Mapping Training from batches 1-6 can be seen in table 3.

Table 3. Evaluation of Basic Level Integrated Cadastre Mapping Training (adopted from PPSDM,2022)

Number of participants	Number of Participants Who Take the Competency Test	Passed	Not pass	Pass Percentage
3689	3105	2415	690	65%

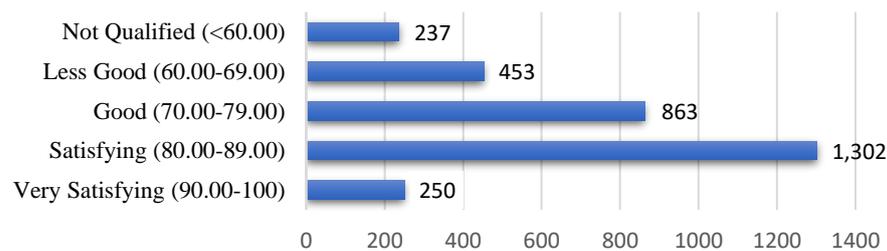


Figure 4 Details of Basic Level Integrated Mapping Training Evaluation Qualifications (adopted from PPSDM, 2022)

The authors got positive comments submitted by participants at the Basic Level integrated land plot mapping training. For example, the training material has high quality, well prepared, and presented by experts. However, during the implementation, the participants stated that it was difficult to access Learning Management System (LMS). Some participants run out of time because of the slow response of LMS web pages. The time allocation for training is also a concern because the participants still have to work in their offices but at the same time they have to follow the scheduled training.

3.3.2 Advanced Integrated Cadastre Mapping Training

1. Purposes

The purpose of the Advanced Integrated Cadastre Mapping Training is to provide knowledge and skills to participants regarding the mechanism for integrating mapping of land parcel measurement through Photogrammetric and Terrestrial methods in GeoKKP. Participants in this Advanced Training are employees within the Directorate General of Land and Spatial Surveys and Mapping (SPPR), who have attended and passed the Basic Level Integrated Cadastre Mapping Training. The learning methods used in this Advanced Training are E-Learning, Distance Learning, and Action Learning Projects.

2. Curriculum

The Advanced Integrated Cadastre Mapping Training Curriculum can be seen in Table 4 below:

Table 4. Advanced Integrated Cadastre Mapping Training Curriculum

Days	Material	Lessons Hour	Method
1	Institution Substantive Technical Content Lectures	2	Distance learning-synchronous
	Overview of Training Policy	1	
	Submission of Practical Assignments	1	
2	Mapping Using Drone	2	Distance learning-Asynchronous
	Making a Work Map	2	
	Measurement of Allied Points and Boundary Points of Land	2	
	Block Adjustments	1	
	Integration of Complete Block Photogrammetry and Terrestrial Mapping Results with the GeoKKP Application	3	
3	Base Map Accuracy Test Obtained from satellite imagery/Aerial Photography/Drone	2	Distance learning-synchronous
	Utilization of Base Map for parcel Identification or Measurement	2	
	Block Adjustments	2	
4-5	Photogrammetric Practice 1: Base Map Accuracy Test obtained from satellite imagery/Aerial Photography/Drone	16	Off-Campus
	Terrestrial Practice 1: Creating a Work Map		
6	Practice, Rounding, Mentoring, and Submitting report	8	Distance learning-synchronous
7-8	Photogrammetric Practice 2: Utilizing a Base Map for Supplementation Identification or Measurement	16	Off-Campus
	Terrestrial Practice 2: Measurement of common ground points and boundary points of land parcels		
	Practice 3 Terrestrial: Block Adjustment		

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Agustyarsah Agustyarsah, Mulyadi Mulyadi, Kariyono Kariyono, Christiana Agustina Yessy, Muzqufa Reagy and Yuniarti Wiwiek (Indonesia)

10	Photogrammetric	8	Off-Campus
	Practice 3: Integration of complete block Terrestrial mapping results with the KKP Geo Application		
11	Practice 4 Terrestrial: Integration of complete block Terrestrial mapping results with the KKP Geo Application	7	Distance learning–synchronous
12	Practice, Roundup, and Mentoring	7	Off-Campus
Total		90	

3. Implementation of Training

Participants who have met the qualifications by completing the cadastre practice and obtaining a score of more than 70.00 are declared to have passed and are entitled to receive a certificate and an award pin. Participants who fail the training will be given the opportunity one time to retake the Advanced Remedial held by the Center for human resource development of ATR/BPN. The 2022 Advanced Integrated Cadastre Mapping Training was held from December 2 to December 27 in 2022 and was attended by 40 participants. Planning in 2023 will be carried out in 4 batches with 2877 participants. Documentation of training implementation can be seen in Figure 5 below:



Figure 5. LMS Platform and Online discussion (adopted from PPSDM, 2022)

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Agustyarsah Agustyarsah, Mulyadi Mulyadi, Kariyono Kariyono, Christiana Agustina Yessy, Muzqufa Reagy and Yuniarti Wiwiek (Indonesia)

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4. Training Evaluation

Assessment of participant graduation is focused on several aspects with the following assessment provisions as shown in figure 6.

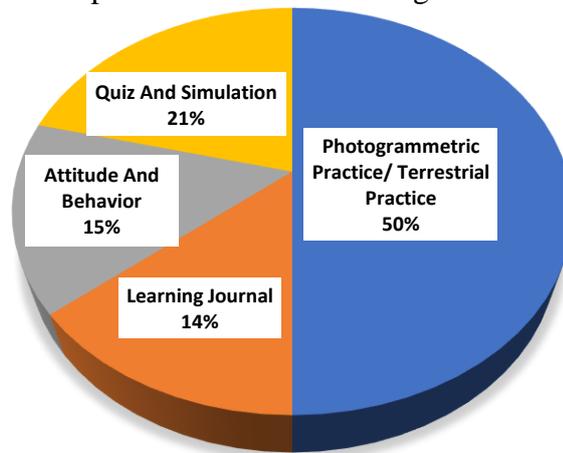


Figure 6. Assessment aspects (adopted from PPSDM, 2022)

Participants passed if they obtain a score above 70.00. The number of participants who passed and failed the Advanced Integrated Cadastre Mapping Training is as follows:

Table 4. Evaluation of Advanced Integrated Cadastre Mapping Training

Number of participants	Passed	Not pass	Pass Percentage
40	36	4	90%

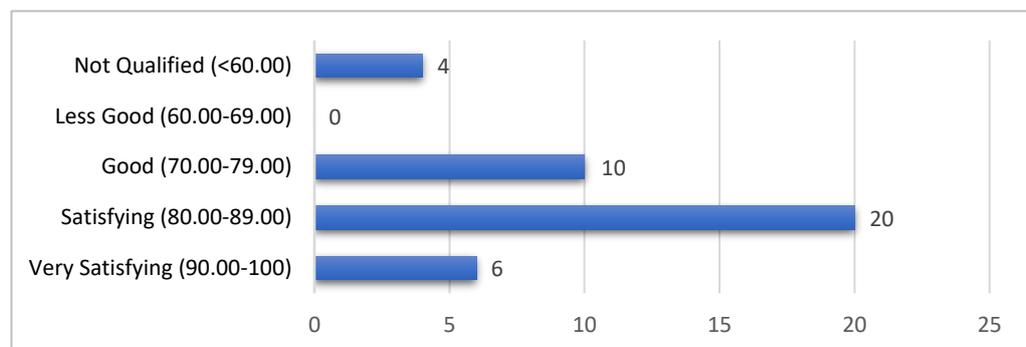


Figure 7. Details of Advanced Integrated Mapping Training Evaluation Qualifications

There were positive comments and suggestions from the participants. Participants stated that the training program is part of the strategic action of ATR/BPN to improve cadastre survey and mapping to improve spatial data quality. However, some of the participants stated that the time for practical implementation and practice was too short.

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Agustyarsah Agustyarsah, Mulyadi Mulyadi, Kariyono Kariyono, Christiana Agustina Yessy, Muzqufa Reagy and Yuniarti Wiwiek (Indonesia)

They also suggested the practical session is designed using a real case study in their land office.

4. CONCLUSION

To accelerate land registration in Indonesia, the Indonesian Ministry of Agrarian Affairs and Spatial Planning/National Land Agency is implemented systematic first land registration to improve tenure security. The implementation shows there are constraints such as spatial data quality and low-level competency of land surveyors. ATR/BPN CorpU is chosen as a strategic tool that integrates various learning resources, processes, and human resources at the ATR/BPN which enables the realization of the best performance by continuously increasing knowledge, skills, and resource behavior human resources in the land offices. Civil servant competency development and ATR/BPN performance improvement are the main targets of the entire learning process at ATR/BPN CorpU.

Basic and Advanced Integrated Cadastre Mapping Training was implemented using 10% of the learning design and it is structured theoretical material. Moreover, it is 20% consist of learning through Social Learning, and 70% is learning by applying material that has been learned through Action Learning Projects in the land offices. The objective of the basic level training is to increase cadastral mapping skills while the advanced training focuses on integrating measurement and mapping of land parcels with precise accuracy through photogrammetry and terrestrial methods using the computerized land office (GeoKKP).

The evaluation results showed that the participants were less motivated in learning because they were still given a routine workload in their respective land offices. Learning infrastructure support (LMS server) need to be improved because of its slow response, thus disrupting the learning process. Based on these conditions, it is necessary to further improve the existing IT infrastructure at the center of human resource development (PPSDM). Using blended learning training, it is suggested that to increase the competency of civil servant land surveyors can be implemented through microlearning and webinars.

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BIOGRAPHICAL NOTES

Agustyarsyah is Director of Human Resource Development Center, Ministry of Agrarian Affairs and Spatial Planning/National Land Agency Indonesia. BAppSc in Land Administration from National Land College and M.Agr in Agriculture from Universitas Syiah Kuala and Dr in Public Administration from Universitas Satyagama.

Mulyadi is Head of Data and Information Division, at the Center of Data and Information, Ministry of Agrarian Affairs, and Spatial Planning/National Land Agency Indonesia. He holds a BSc in Geodesy from Universitas Gadjah Mada and M.App.Sc in Geographical Information System from The University of Melbourne and Ph.D in Geospatial Science from RMIT University Australia.

Kariyono is Head of Surveying and Mapping, Malang City Land Office. He holds a BAppSc in Land Administration from National Land College and M.Eng in Geomatic Engineering from Universitas Gadjah Mada. Ir in Engineer profession from Universitas Diponegoro.

Agustina Yessy Christiana is Head of Competency Development Division, Human Resource Development Center, Ministry of Agrarian Affairs and Spatial Planning/National Land Agency Indonesia. He holds a BAppSc in Land Administration from National Land College and M.Eng in Geomatic Engineering from Universitas Gadjah Mada.

Reagy Muzqufa is Head of Functional Position Competency Development Human Resource Development Center, Ministry of Agrarian Affairs and Spatial Planning/National Land Agency Indonesia.. He holds a BSc in Geography from Universitas Indonesia.

Wiwiek Yuniarti is a Head of Competency Assesment Divison, Human Resource Development Center, Ministry of Agrarian Affairs and Spatial Planning/National Land Agency Indonesia. He hold S Psi in Psychology Universitas Diponegoro and M Psi in Psychology from Universitas Indonesia.

CONTACTS

Agustyarsyah

Human Resource Development Center, Ministry of Agrarian Affairs and Spatial Planning/National Land Agency Indonesia.

Jl. Akses Tol Cimanggis, Cikeas Udik, Kec. Gn. Putri, Bogor, Jawa Barat 16966, INDONESIA

Tel. +6221 8674586

Email : agustyarsyah@atrbpn.go.id / agustyarsyah1108@gmail.com

Website : www.atrbpn.go.id / www.ppsdm.atrbpn.go.id

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Agustyarsah Agustyarsah, Mulyadi Mulyadi, Kariyono Kariyono, Christiana Agustina Yessy, Muzqufa Reagy and Yuniarti Wiwiek (Indonesia)

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