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Reinforcing Non-University Sector at the Tertiary Level in Engineering and Technology to Support Thailand Sustainable Smart Industry

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WP4: Quality Control and Monitoring

Training Evaluation Results vol. 5

(November 2022-January 2023)

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Disclaimer

Revision Sheet

Version	Date	Author (Partner/Person)	The revision reason
V1	Jan 5, 2023	Danaipong Chetchotsak	First draft
V2	Jan 23, 2023	Danaipong Chetchotsak	Add DA at Chaiyapoom
V3	Mar 6, 2023	Danaipong Chetchotsak	Complete the whole paragraph.
V4	Apr 1, 2023	Danaipong Chetchotsak	Revision per QCMB comments

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1 Executive Summary

The training evaluation results during the period November 2022 – January 2023 were reported. During this period, eight training events were conducted: one from WP.2 (Training the Thai Trainers) and seven from WP.3 (Training teaching staff from the non-university sector at tertiary education level). Once each of the training events had been concluded, all the participants were required to fill in the questionnaires. Here, the participants were asked to give ratings (scores) to each of the satisfaction statements along with their comments. The satisfaction score ranged from 1 to 5. Their meanings were as follows. A score of 1 was for "Totally disagree;" 2: "Disagree;" 3: "I am not sure;" 4: "Agree;" and 5: "Totally agree." The average satisfaction scores for each training were then computed and demonstrated in the form of bar charts along with the corresponding 95% confidence intervals.

Their results showed that all the trainings had a score of 4 or above with a small variation. Although some of the participants mentioned that they did not have enough background for some trainings, all of them however, declared that their knowledge and experience for the corresponding trainings have been improved. In terms of comments, most of the participants' comments were positive. In general, the participants were satisfied with the trainings and there was no concern for the training at all.

2 Introduction

The training evaluation results during the period Nov 2022- Jan 2023 were presented in this report. Table 1 showed the training events in the reported period. According to Table 1, there was one training event from WP.2 (Task 2.4: Training the Twelve Thai Trainers) and Seven events from WP.3 (Task 3.2: Training teaching staff from the non-university sector at tertiary education level). The report served as quality feedback for WP.2 and WP.3. It also provided suggestions for risk management for the project. `

Table 1 Training events evaluated during Nov 2022-Jan 2023

Training number	Date	Task	Topic	Venue	Number of attendances
1	Dec 8-10, 2022	2.4	Digital Manufacturing (DM)	AIT	12
2	Nov 9-11, 2022	3.2	Data Analytics (DA)	PSU	14
3	Nov 14-15, 2022	3.2	Applications of Optimization and Technology in Value Chain (AOV)	KKU	9
4	Nov 19-21, 2022	3.2	Innovative Product Design and Development (PDD)	Suratthani Rajabhat University	8
5	Nov 30-Dec 2, 2022	3.2	Innovative Product Design and Development (PDD)	KKU	10
6	Dec 12-14, 2022	3.2	Communication and People Skills Development (CPD)	Chaiyaphum Rajabhat University (12-14 Dec 22)	13
7	Jan 18-20, 2023	3.2	Data Analytics (DA)	Chaiyaphum Rajabhat University	11

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Training number	Date	Task	Topic	Venue	Number of attendances
8	Jan 19-21, 2023	3.2	Communication and People Skills Development (CPD)	Silpakorn University, Sanam Chandra Palace	10

3   Methodology

To evaluate the training events, all the participants were required to fill in the questionnaires (evaluation template), as shown in ANNEX I. The participants were asked to rate levels of agreement of the satisfaction statements in Part 2.1 of the questionnaires. In this regards, levels of agreement, satisfaction scores, and training scores were used interchangeably in this report. Once the questionnaires were filled in, the average scores were computed. The average agreement scores for each training event were illustrated in terms of bar charts along with the corresponding 95% confidence intervals. Distribution of the participants' ratings were provided in the form of bar charts as shown in ANNEX II. Moreover, the trainees' comments as in Parts 2.2, 2.3, 2.4, 3.1, and 4 of the questionnaires were given in ANNEX III.

4   Training evaluation results

4.1   Training the trainers (Task 2.4)

This section reported the evaluation results for the training conducted by WP.2 (Training the Thai Trainers). In this case, only one training (Training 1) was conducted by WP.2. The average scores of Training 1 along with the 95% confidence interval were given in Figure 1. The figure showed that Training 1 had an average score of 4 or above for all satisfaction statements, except Statement a). In this matter, Statement a) asked the participants if they had sufficient background for this training. Here the average score was 2.8 with a large variation. Such incidents indicated that most of the participants did not think that they had enough background for this training. After the training however, most participants indicated that their knowledge and experience for this training have been improved with an average score of 4.5 (Part h).

In general, all the participants were satisfied with the training. Figure A1 of ANNEX II and Table A1 of ANNEX III also concurred with such results. Here Figure A1 depicted the distribution of the scores while Table A1 provided the Participations' comments. Examples of positive comments were as follows: "I have more knowledge and experience to teach my students in AM class in this semester." and "The most meaningful experience I obtained from the training were the in-class exercises and lots of examples. The exercises and classwork would be very handy for our teaching practice in the future."
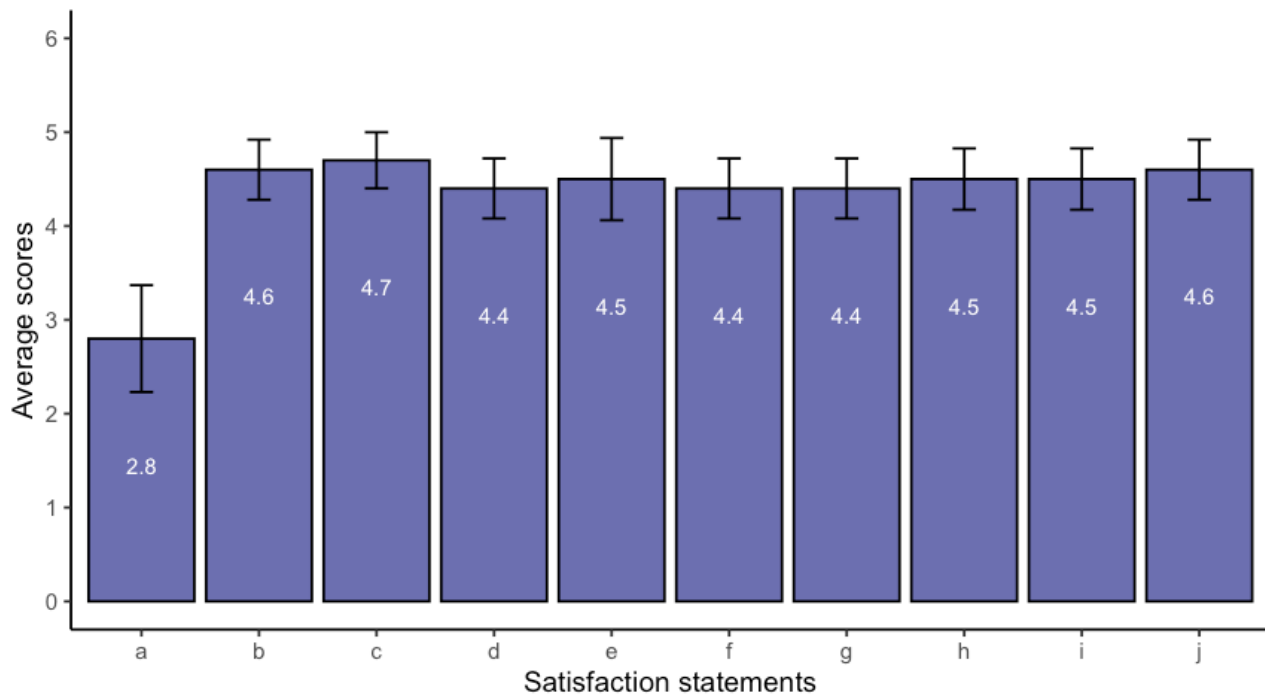
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Figure 1   Average scores of Training 1:   Digital Manufacturing at AIT during Dec 8-10, 2022

4.2   Training teaching staff from the non-university sector at tertiary education level (Task3.2)

This section reported training evaluation results of WP. 3. Figures 2-8 depicted the average scores with the corresponding 95% confidence interval of Trainings 2-8, respectively. Distribution of the scores for the trainings were then illustrated in Figures A2-A8 of ANNEX II. Similar to the case of Training 1, Trainings 2-8 had a score for Statement a) considerably smaller than other statements. This also suggested that most of the participants thought that they did not have sufficient background for the training. After the training on the other hand, their knowledge and experience have been improved likewise (see the score of Statement i) of Figures 2-8).

In general, most trainings had a score for Statement b) to Statement j) of Four or above. Nevertheless, there was a minor concern for Training 2 (Data Analytics at PSU). In Figure 2, the score for Statement d) was roughly below 4. Looking into details, the statement in this matter did not ask the participants anything concerning satisfaction nor quality of the training. Statement d) asked that if the training was relevant to their teaching profession. Figure 2 and Figure A2 however showed that most participants were satisfied with the training. Moreover, more than 90% of them indicated that the training was a valuable experience for their professional growth (See Figure A2, part h). In most cases, the participants were satisfied with all trainings. Most of them gave a satisfied rating.
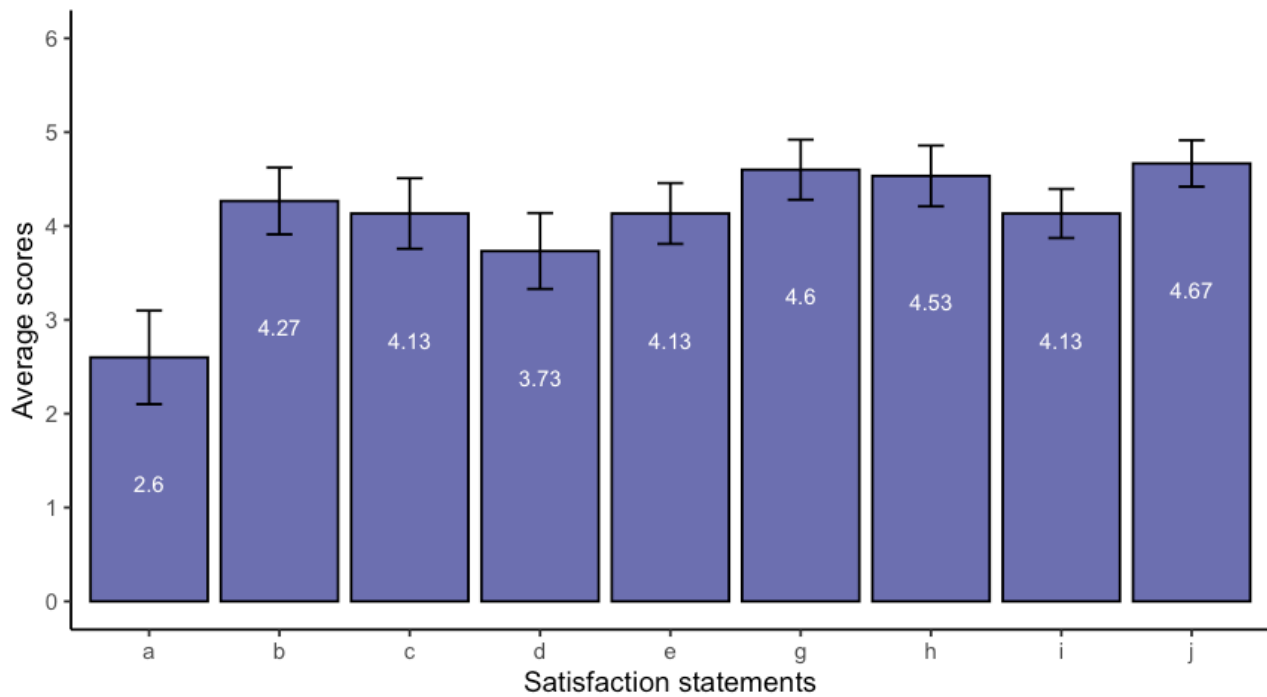
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Figure 2   Average scores of Training 2: Data Analytics (DA) at PSU during Nov 9-11, 2022

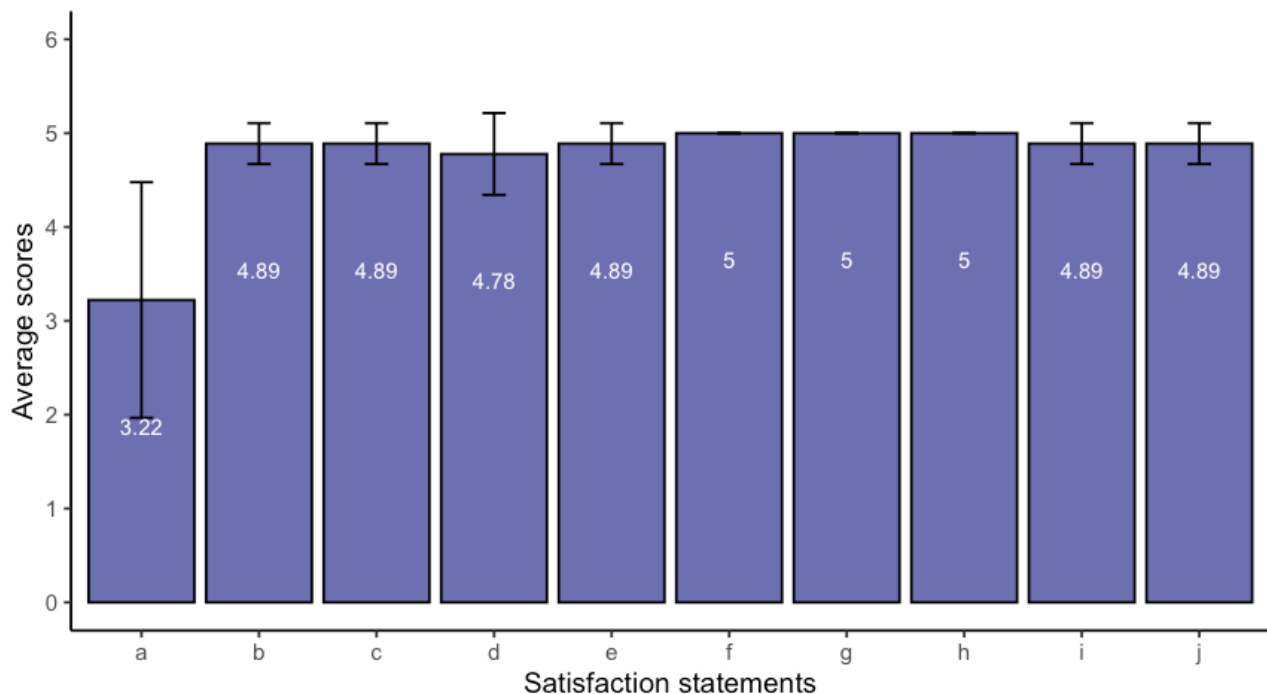**Figure 3**   Average scores of Training 3: Applications of Optimization and Technology in Value Chain (AOV) at KKU during Nov 14-15, 2022
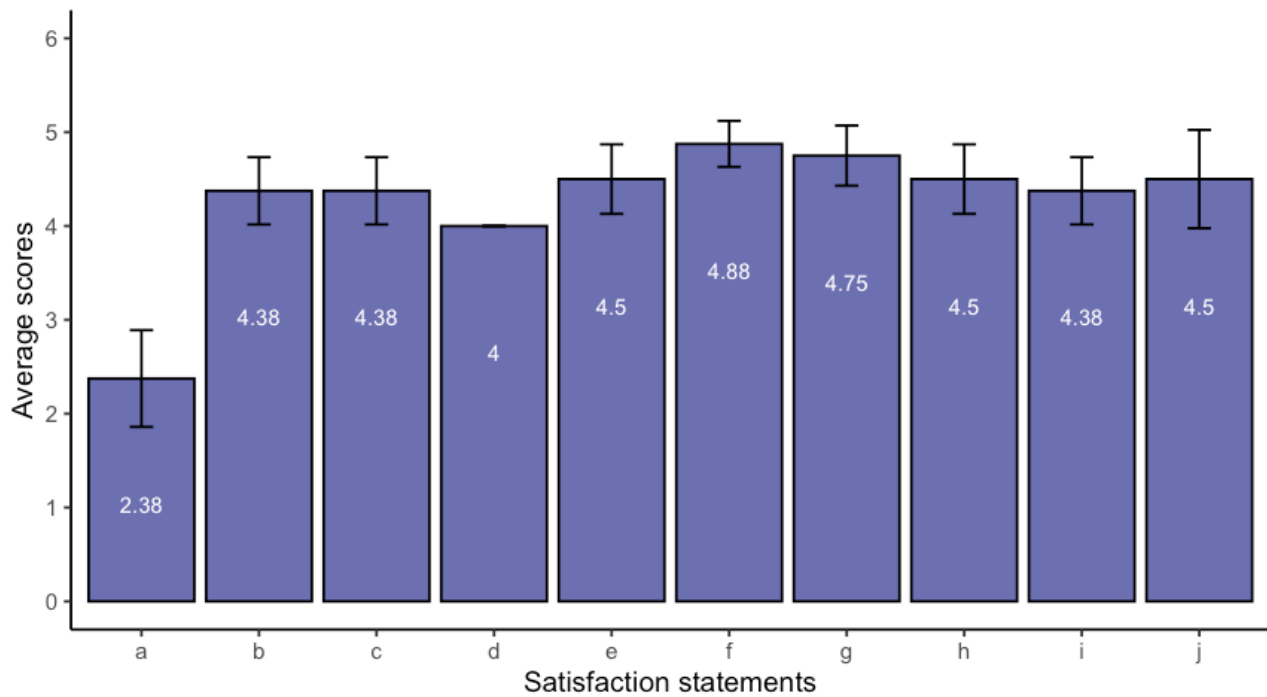
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Figure 4 Average scores of Training 4: Innovative Product Design and Development (PDD) Suratthani Rajabhat University during Nov 19-21, 2022
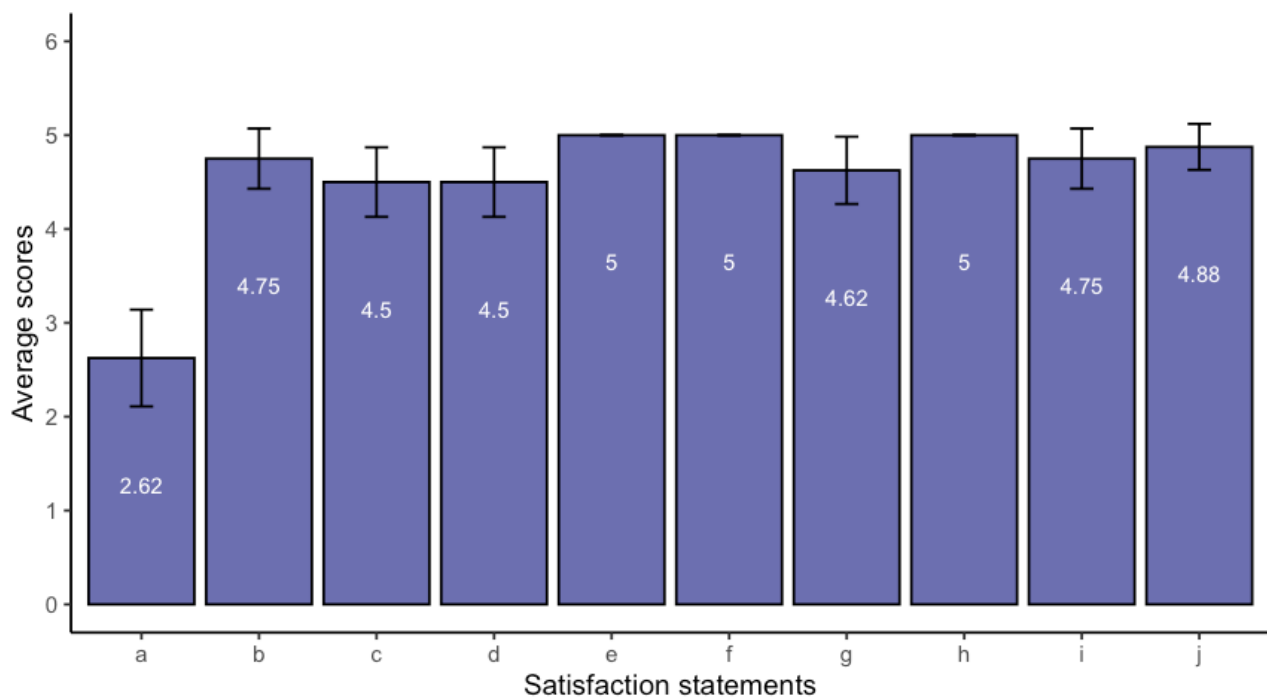

Figure 5 Average scores of Training 5: Innovative Product Design and Development (PDD) at KKU during Nov 30-Dec 2, 2022

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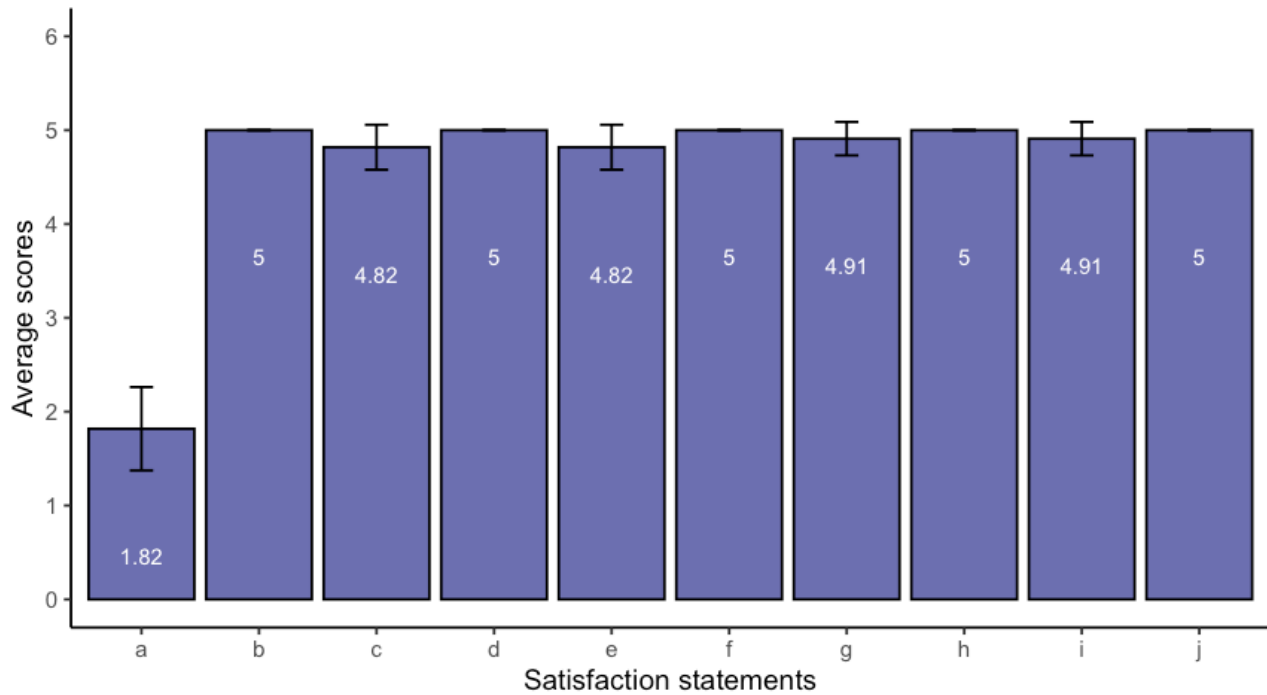Co-funded by the
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Figure 6   Average scores of Training 6: Communication and People Skills Development (CPD) at Chaiyaphum Rajabhat University during Dec 12-14, 2022
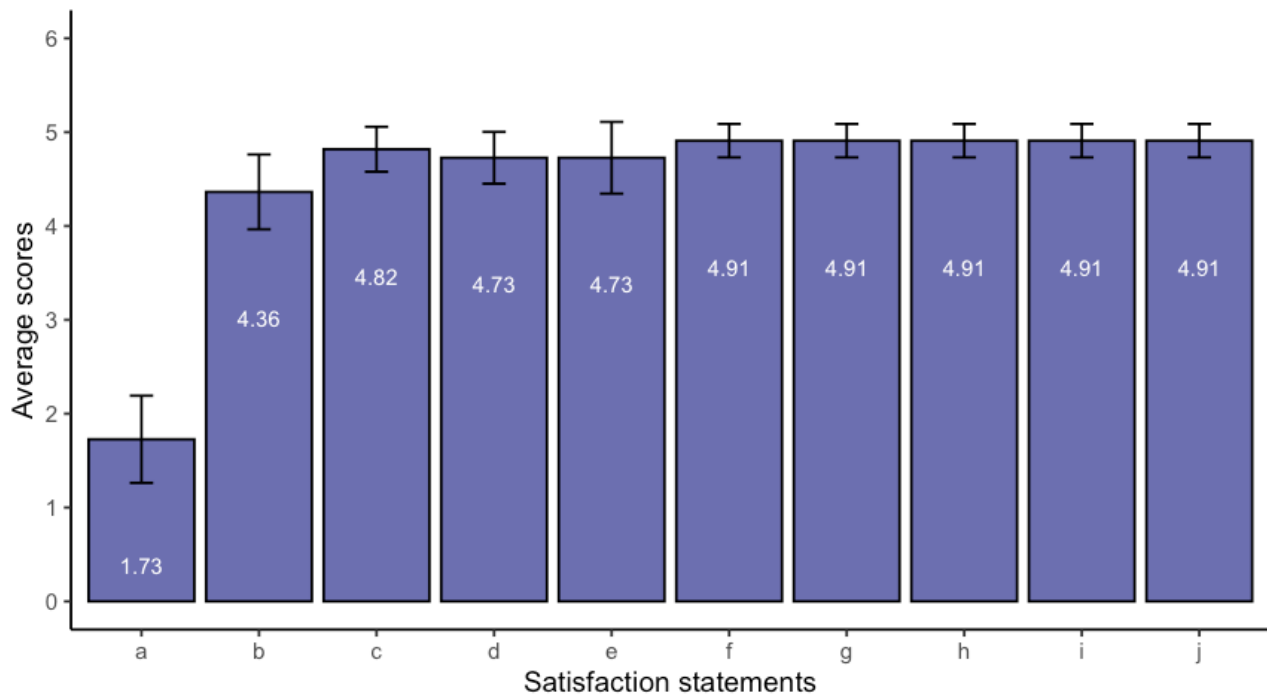

Figure 7   Average scores of Training 7: Data Analytics (DA) at Chaiyaphum Rajabhat University during Jan 18-20, 2023

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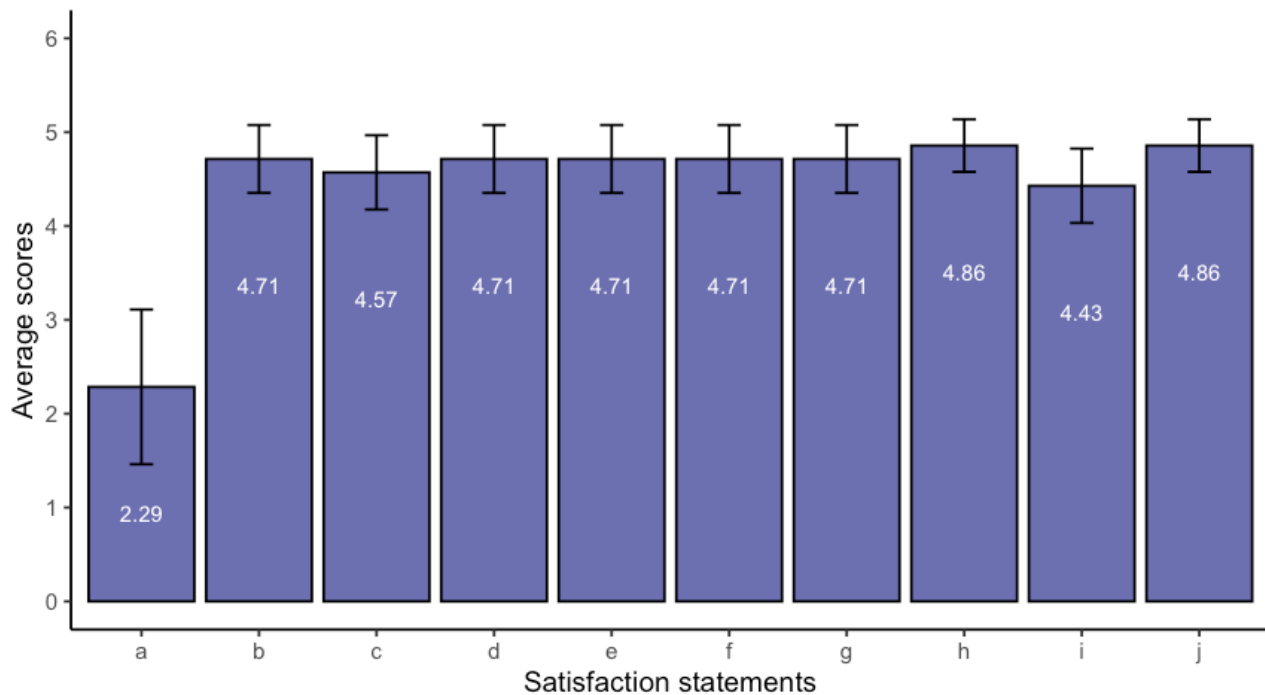Co-funded by the
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Figure 8   Average scores of Training 8: Communication and People Skills Development (CPD) at Silpakorn University, Sanam Chandra Palace during Jan 19-21, 2023

Tables A2-A8 tabulated comments for Trainings 2-8, respectively. Most of the common comments were that the participants can apply the knowledge and experience from the trainings into their teaching and research practices. Examples are as follows: Training 2: "It can be used for teaching and research."; Training 3: "High chance of applying the knowledge I learnt in local practice." In terms of recommendations from the participants, most of the common comments were that the time was too short. In most cases, all the recommendations were positive. The examples were as follows: "Wish to have more trainings for other topics (Training 4)."; "The contents in the training were very difficult to understand but with the guidance of the instructor it was understandable (Training 6)."; and "I want to learn more of using software in DA, Python and other software (Training 2)."

5   Conclusion

Training evaluation results during the period Nov, 2022-Jan 2023 were presented in this report. Here there were eight training events: one from WP.2 and seven from WP.3. The evaluation results showed that the participants were satisfied with all trainings with an average score of 4 or above. Although some of the participants mentioned that they did not have sufficient background for some trainings, all of them declared that their knowledge and experience have been improved after the training. In terms of comments, all the trainings had no major concern. All the comments in general were positive.

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ANNEX I: The training evaluation template

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TRAINING EVALUATION TEMPLATE

Dear Participant,

Thank you for attending the training activities carried out at _____ [University], _____ [city and country], _____ [date]. In our effort to analyze the impact of the training, we invite you to complete the following questionnaire.
We appreciate your valuable contribution and we thank you in advance!

1. GENERAL INFORMATION
- 1.1) Sex (Please tick the appropriate option): ◯ Female   ◯ Male
- 1.2) Your Age _____
- 1.3) Teaching experience (in years) _____

2. OVERALL FEEDBACK
2.1) In a scale 1 to 5, please identify for each item your level of accordance.
1: Totally Disagree, 2: Disagree, 3: I am not sure, 4: Agree, 5: Totally Agree

Statement	Level of your agreement *(1-5)*
a) I have sufficient background for this training.	
b) The training was useful and relevant for the project activities.	
c) I understood the concepts presented in the training.	
d) The themes / topics developed in the training were relevant for my teaching practice.	
e) I had an active participation during the training activities.	
f) The trainers had an effective approach during the activities developed.	
g) The training materials used were useful for the project activities.	
h) The training was valuable experience for professional growth.	
i) After the training, my knowledge and experiences in this subject have been improved.	
j) I will recommend this training to somebody else.	

2.2) In my opinion, the positive aspects of the training were:

_____

_____

_____

_____

_____

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2.3) In my opinion, the less positive aspects of the training were:

_____

_____

_____

_____

_____

2.4) Suggestions and other comments.

_____

_____

_____

_____

_____

3. IMPACT OF THE TRAINING

3.1) In your opinion, what was the most meaningful experience carried out in the context of the training, taking into account the project activities to be developed and the challenges of your teaching practice? Please, justify your answer (including examples).

_____

_____

_____

_____

_____

4. ANY FURTHER COMMENTS

_____

_____

_____

_____

_____

Thank you for your cooperation.

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ANNEX II: Distribution of the training scores

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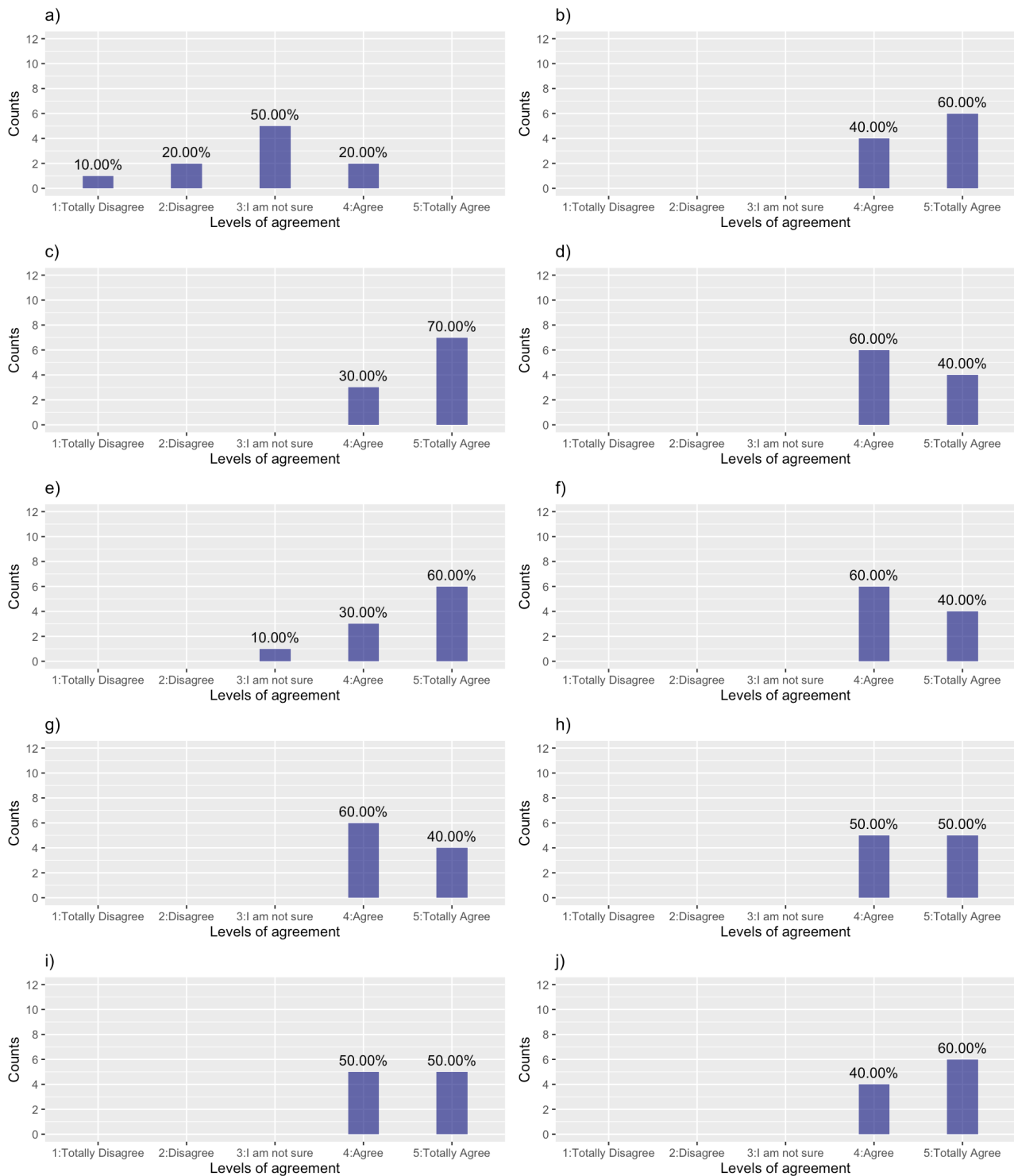
Figure A1   Distribution of scores of the Training: Digital Manufacturing (DM) at AIT during Dec 8-10, 2022

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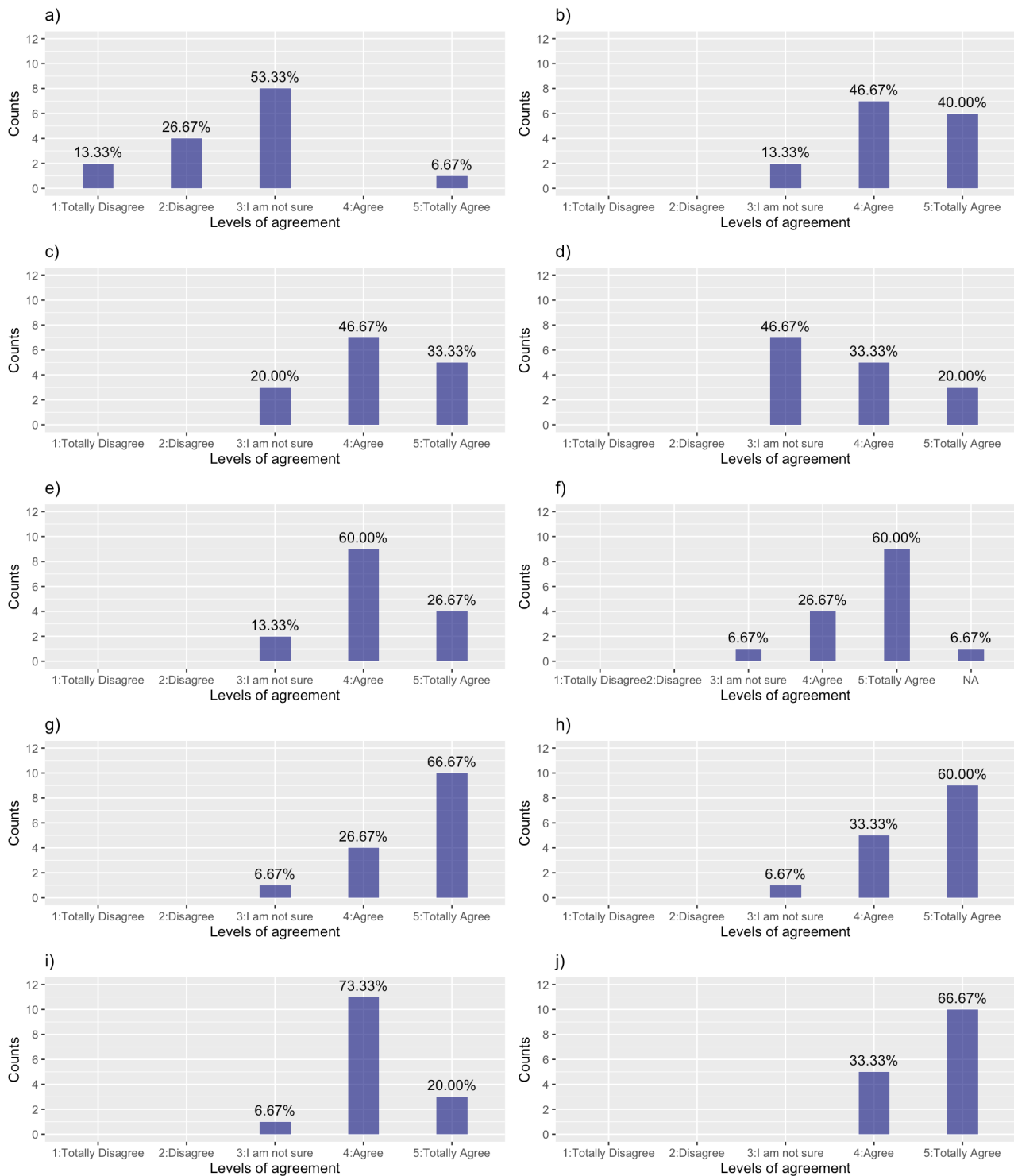
Figure A2   Distribution of scores of Training 2: Data Analytics (DA) at PSU during Nov 9-11, 2022

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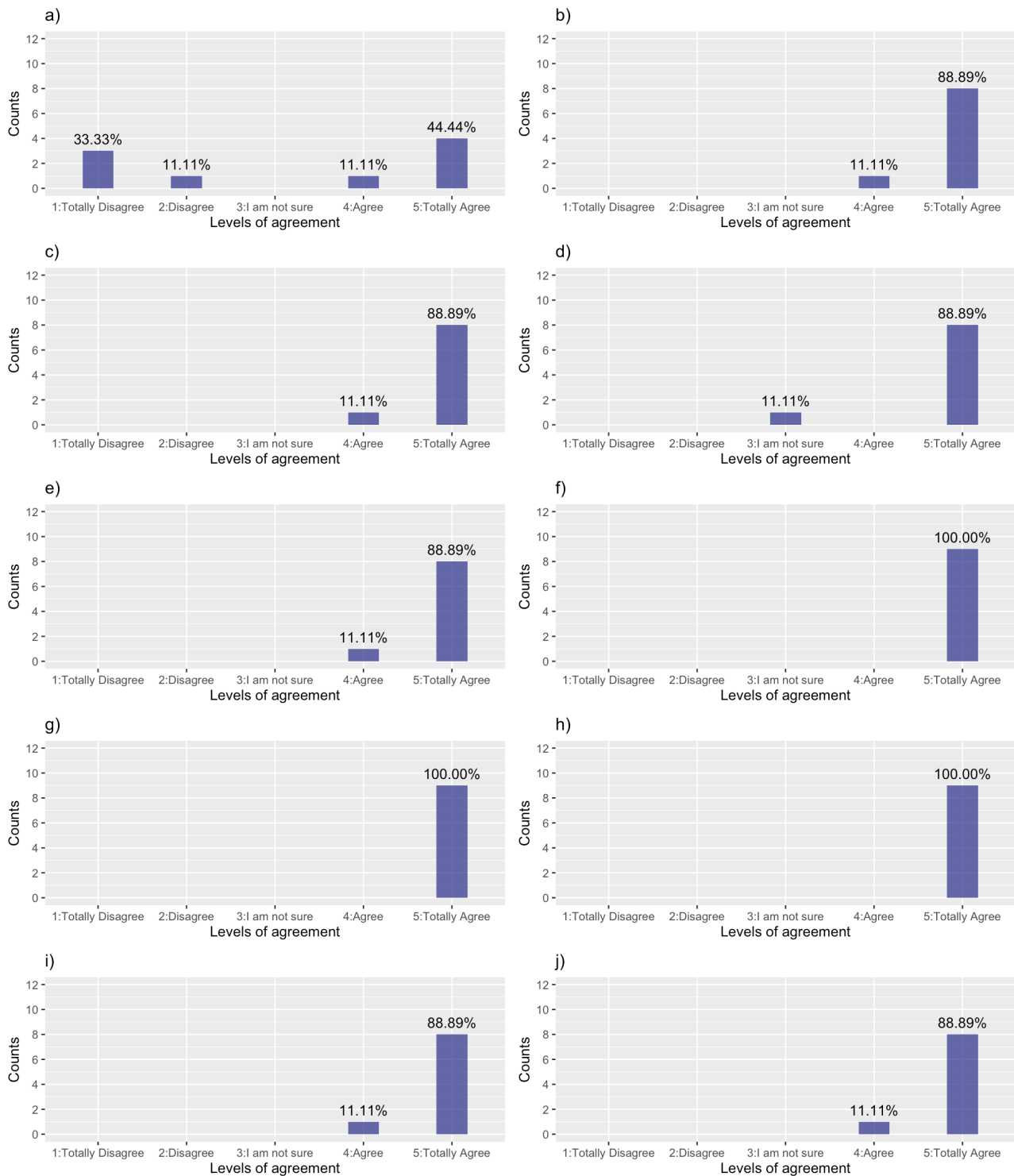Co-funded by the
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Figure A3   Distribution of scores of Training 3: Applications of Optimization and Technology in Value Chain (AOV) at KKU during Nov 14-15, 2022

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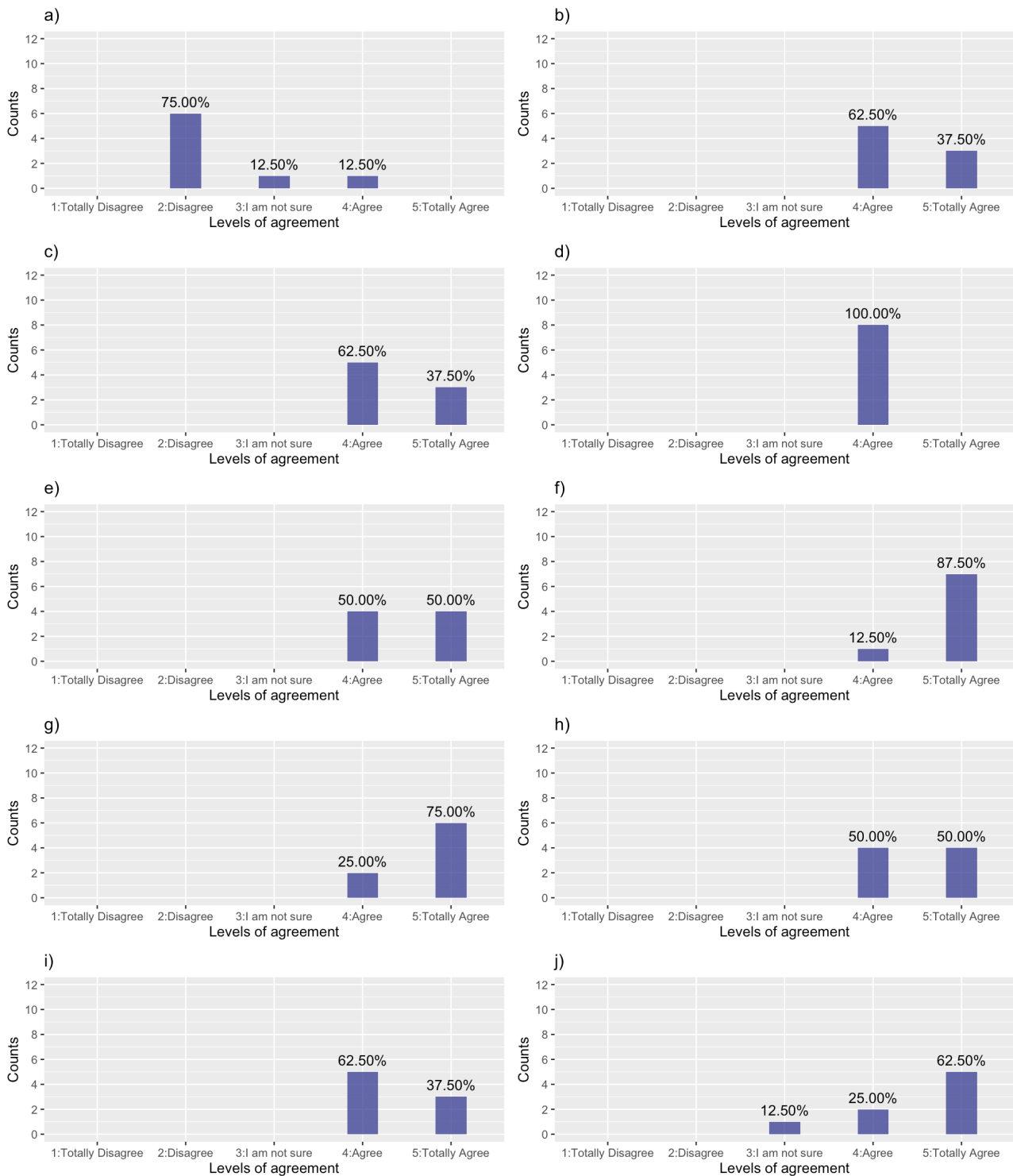Co-funded by the
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Figure A4   Distribution of scores of Training 4: Innovative Product Design and Development (PDD) at Suratthani Rajabhat University during Nov 19-21, 2022
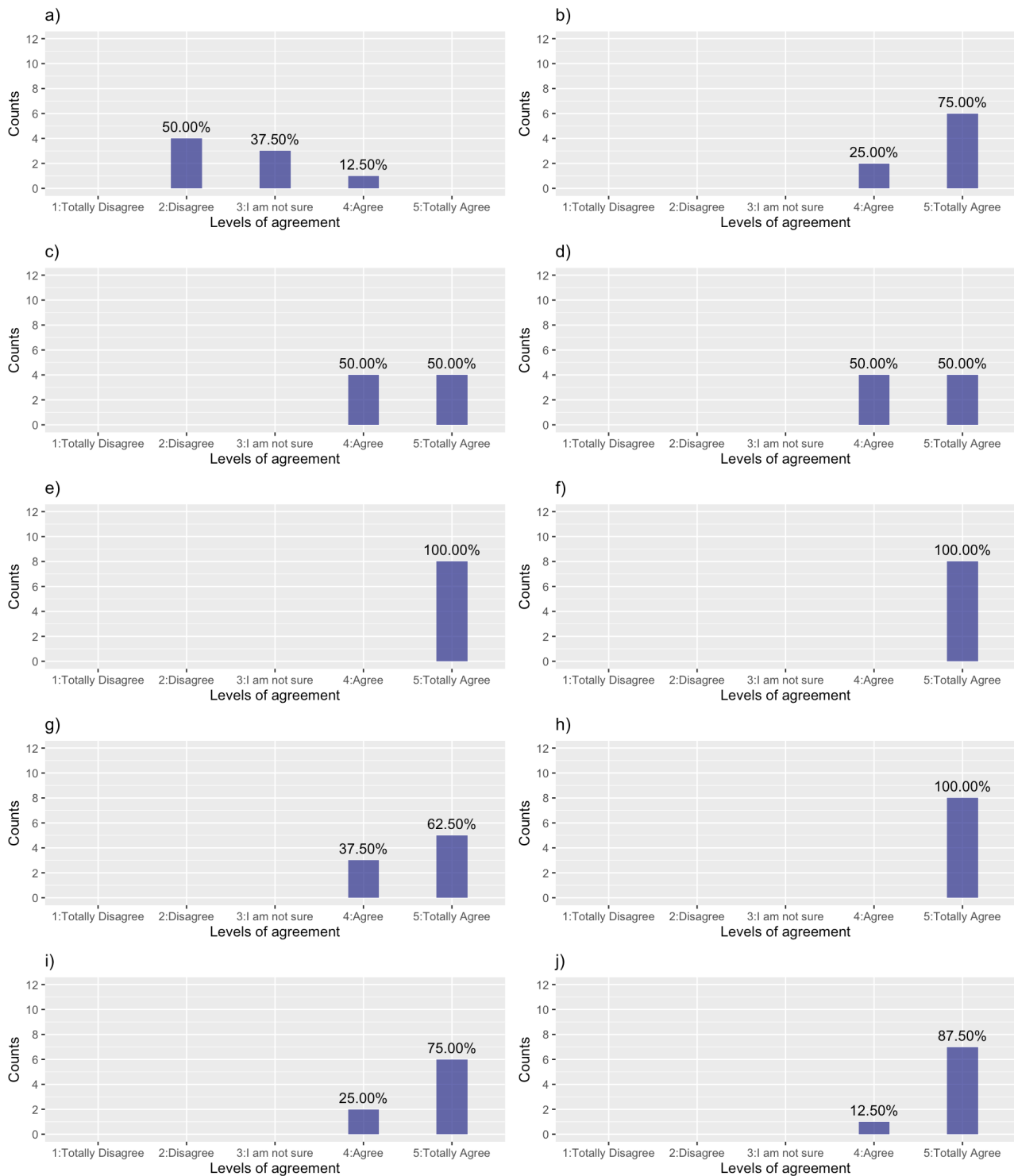
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Figure A5 Distribution of scores of Training 5: Innovative Product Design and Development (PDD) at KKU during Nov 30-Dec 2, 2022

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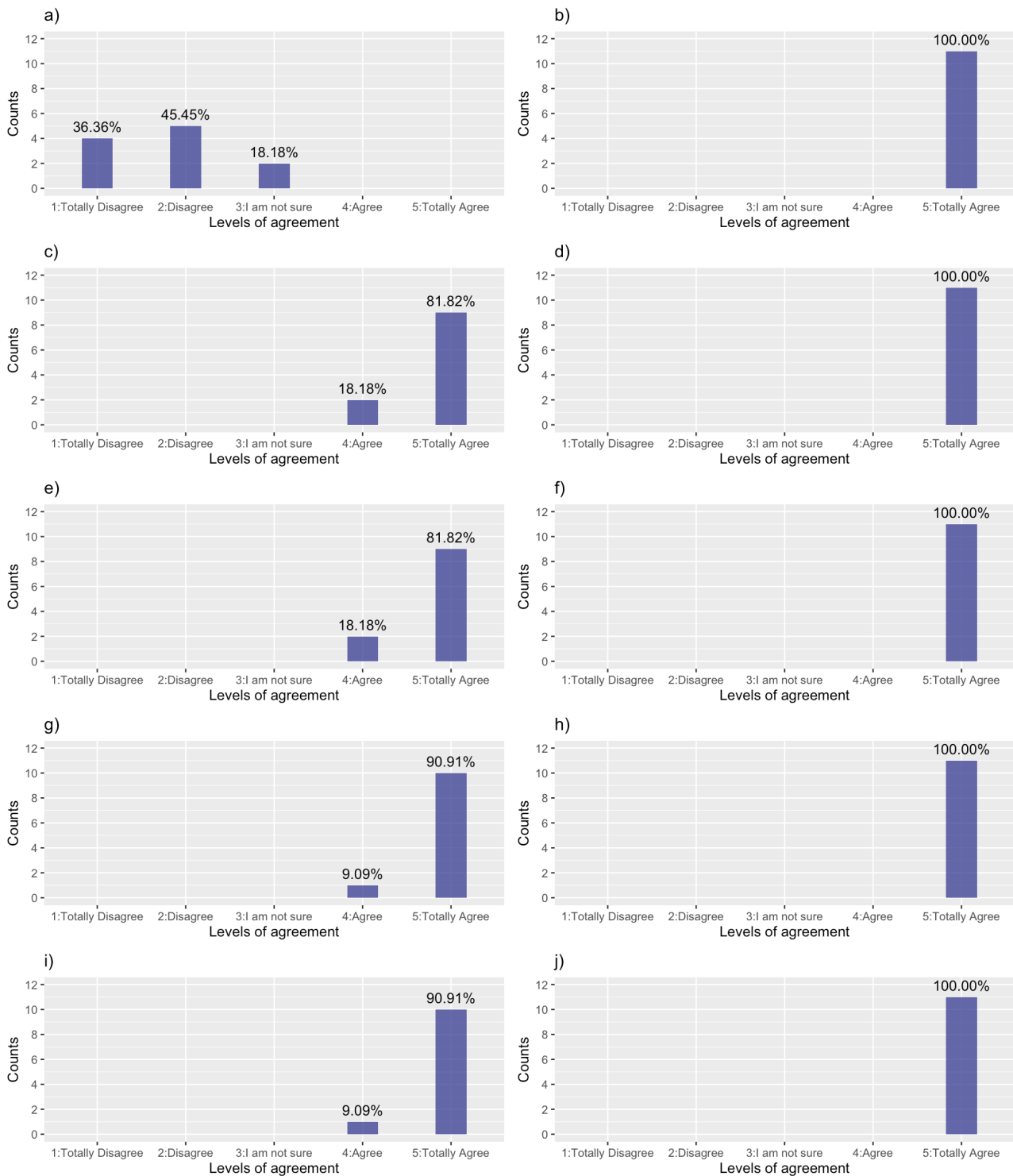Erasmus+ Programme
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Figure A6   Distribution of scores of Training 6: Communication and People Skills Development (CPD) at Chaiyaphum Rajabhat University during Dec 12-14, 2022
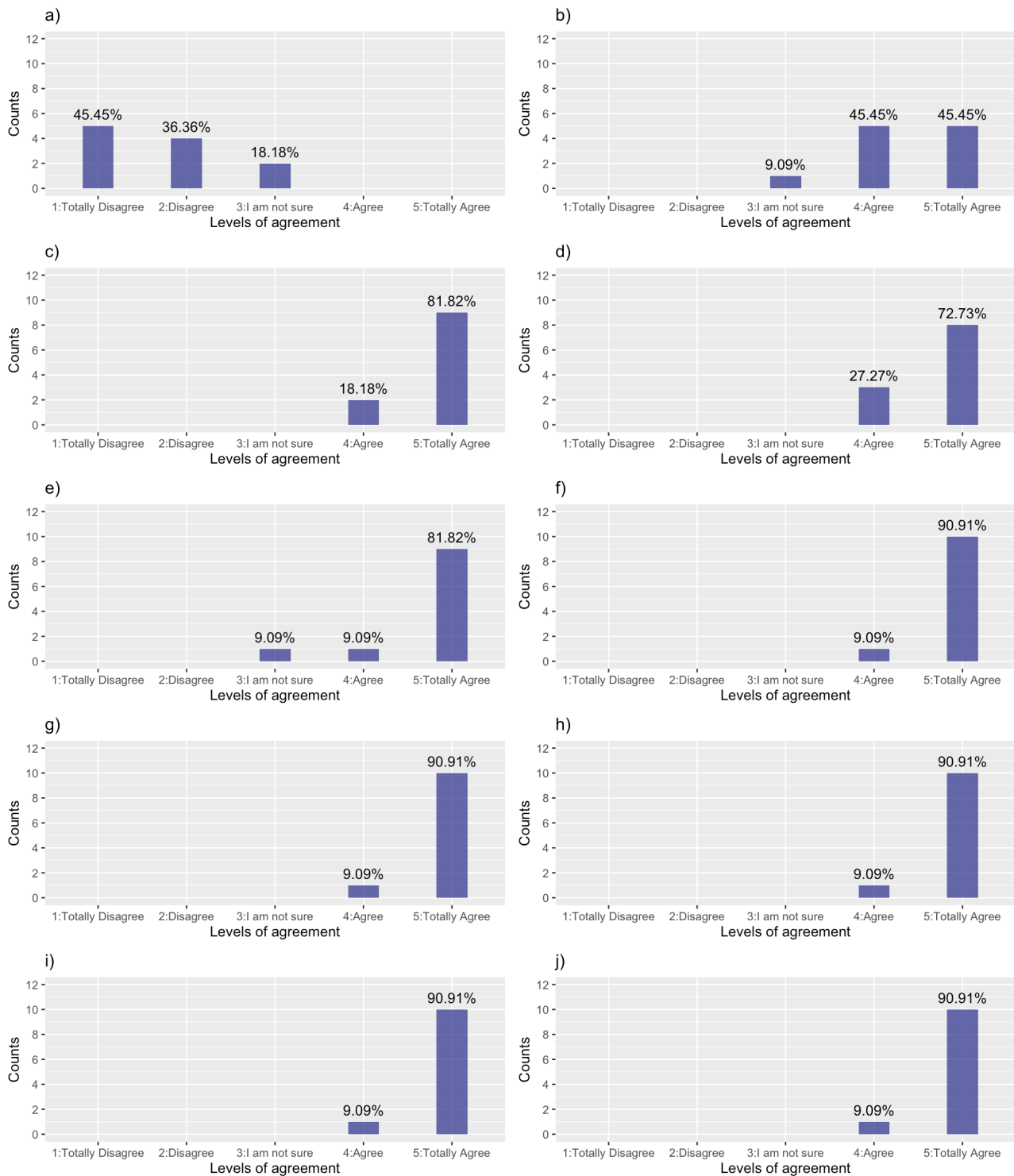
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Figure A7   Distribution of scores of Training 7: Data Analytics (DA) at Chaiyaphum Rajabhat University during Jan 18-20, 2023

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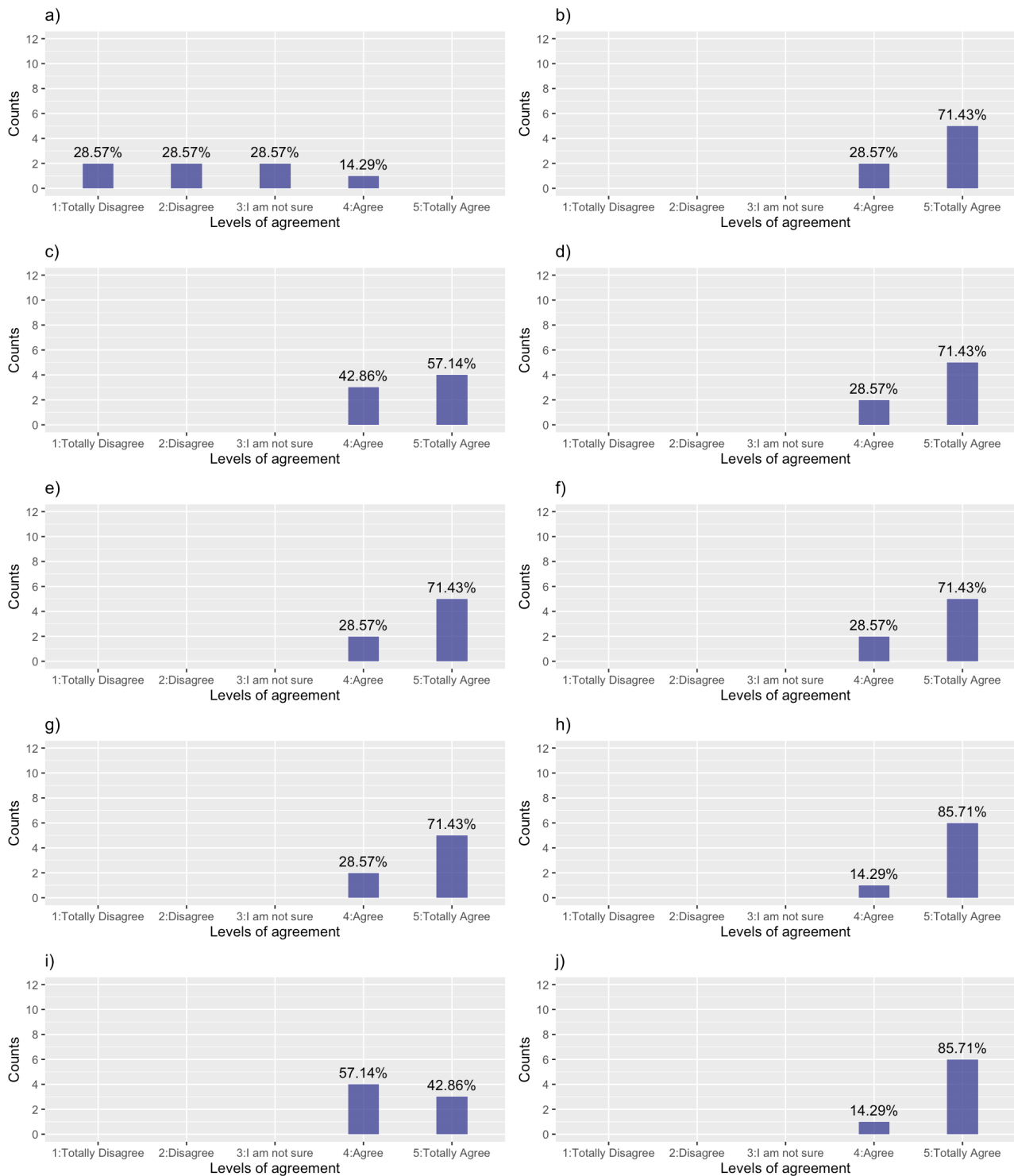Erasmus+ Programme
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Figure A8   Distribution of scores of Training 8: Communication and People Skills Development (CPD) at Silpakorn University, Sanam Chandra Palace during Jan 19-21, 2023

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ANNEX IV: Trainees' comments

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Table A1   Comments on Training 1 (Digital Manufacturing (DM) at AIT during Dec 8-10, 2022)

The positive aspects revealed by the trainees

- The practice of the techniques, both Plant Simulation and 3D Printing Tech.
- The use of 3D Printing.
- Applied Plant Simulation and 3D Printing in real cases.
- Practicing and discussing of 3D Printing in variety cases.
- New knowledge, FMD techniques, application usage.
- Activities are good.
- Discussion based on learning.
- Actual practice in 3D Printing.
- Hand on new technologies (Plant Sim and 3D Printing).
- Good technology to learn. Many example, especially additive manufacturing.
- Learn new technology and use the applications.
- Gave me more knowledge and experiences in AM.
- I have more knowledge and experience to teach my students in AM class in this semester.
- Active learning activities.
- Good training and clear examples and practices.
- 3D Printing is very useful.
- The trainers explained the materials very clearly and precisely. All the presentation materials are very informative and easy to understand. There were a lot of lot of useful exercises which helped me to understand better. There was a lot of useful technical information about 3D printing that I had not known before. Also, the trainers had very good time management.
- The most meaningful experience I obtained from the training were the in-class exercises and lots of examples. The exercises and classwork would be very handy for our teaching practice in the future.
- I got much knowledge in the Additive manufacturing.
- I had a chance to learn new knowledge, which should be beneficial to the student in my course.

Recommendations from the trainees

- Time to perform 3D Printing and 3D Printing M/C.
- Too much lecture-based teaching in the first day.
- Need more time.
- Too much lecture-based activities.
- Should have more time for simulation.
- The topic Printing technique should come with VDO.
- Too many lectures for the first day.
- Need more real implementation for Digital Twin and Simulation.
- Need more VDO example for better understanding.
- I need more time to learn.

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Recommendations from the trainees

- There were not many materials about other aspects of "Digital Manufacturing" beyond 3D printing.
- I feel that the Additive manufacturing topic is disconnect from other topics.
- More detail for the first part (Digital manufacturing and Simulation) would be good

Table A2   Comments on Training 2 (Data Analytics (DA) at PSU during Nov 9-11, 2022)

The positive aspects revealed by the trainees

- It is a topic that is useful for both teaching and research.
- Excellent lecturer, able to convey knowledge very well. Documents are detailed.
- Gained knowledge about data management
- Get an idea to take into consideration to suit the data obtained from the observations for further analysis.
- It can be used for teaching and research.
- Be able to apply knowledge to research and teaching
- Apply the knowledge gained to research and teaching.
- statistic and regression
- Data Clustering
- Data Clustering, Data Visualization
- Regression
- Have knowledge in applying it to teaching
- Acquire basic knowledge in order to be able to study further.
- Research and Teaching in the future.
- Clustering and Classification
- Have applied the knowledge gained to data management and can apply some content for teaching and research
- Know the principles of data management, which is important for use in data analysis research. To represent the relationship and meaning of the data and use it to compare the data for decision making.
- From training and practice, the principles obtained can be further applied in material research.
- Have an understanding of the practice of making examples. There should be more to learn.
- It can be extended to work on related research
- Being able to practice using the colab program because it is something new from learning in this training.
- The practice can be extended to research work such as programming to do data clustering and data classification.
- applied in teaching and research
- Develop knowledge and apply it in teaching and research
- Student research on forecasting
- Predictive Maintenance
- Getting ideas and using new program functions to be used to manage data more easily.

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- Able to analyze a large amount of preliminary data using the appropriate software for this data analysis.

Recommendations from the trainees

- It is too little time for training Because each topic is all interesting.
- No knowledge of using the program.
- Documents in English.
- Able to use the program proficiently.
- gained more knowledge.
- all topics are interesting.
- Data Clustering.
- Introduction.
- The training time is relatively less.
- Have experience and apply the knowledge from the training to analyze the data correctly.
- It should be held continuously. It should identify tools and more details such as classification methods should be practiced two days.
- Both speakers gave good knowledge. But I want Aj. Kwang to increase the intensity of the tone of the voice like the Aj. Ton to attract better attention during the training.
- "It is a training that is useful in the use of information in many areas, suitable for helping to make good decisions.
- There are activities to make more understanding."
- The program is too difficult to use in the program. Must have a longer training period.
- If there is a new course, I will join again.
- all topics are interesting.
- Would like to attend other training courses.
- This training is useful for analyzing large amounts of data.
- It should be held continuously. It is a very good training.
- I would like to have more good training projects like this because it allows teachers to upskill in certain topics and reskill in things they used to know but have disappeared.
- Additional examples from research or related to learners.
- Techniques for applying the program.
- Must have basic knowledge of the program used to analyze the data.

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Table A3   Comments on Training 3 (Applications of Optimization and Technology in Value Chain (AOV) at KKU during Nov 14-15, 2022)

The positive aspects revealed by the trainees

- I can use program (Lingo) and understand concept, basic example of Operation Research.
- I understand concept and use Lingo and Excel to run program for Math.
- High chance of applying the knowledge I learnt in local practice.
- Having a clear picture from case studies shown in class. This can be applied in future project research.
- The training is informative. The speaker explained very clearly.

Recommendations from the trainees

- I think it is difficult to learn this unit. But if I can use it, it help me to design and plan for the project for the community.

Table A4   Comments on Training 4 (Innovative Product Design and Development (PDD) at Suratthani Rajabhat University during Nov 19-21, 2022)

The positive aspects revealed by the trainees

- To work as a team.
- Received more knowledge of product design and use it to teach in my class.
- Understand the concept of product design from start to finish.
- The training was useful for community products, business strategies, teaching a class.
- The instructor gave a clear lecture.
- I can apply this concept to help the community in product design.
- Very good for community. I can apply this training to help the community. It also helps me to develop new curriculum.
- QFD is a good tool, helping me to develop new curriculum.
- Very experienced instructor.
- I have gained more knowledge, teamwork, systematic thinking.
- I can see the picture clearly, understanding of Product Design systematically.
- Teamwork, creativity.
- To learn PDD from start to finish.
- Great and experience instructor.
- Very good training with good example.
- Learn PDD systematically.
- Systematic lecture with practices.
- Very useful topic.

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Recommendations from the trainees

- Time was too limited.
- Wish to have more time.
- Wish to have more training for other topics.
- My background was too little, so I must pay attention very carefully.
- Need more example in product design for local community.
- Wish to have similar training like this again with real practice.
- Time was so limited. Need more time.
- Need more training in other topics.
- Time was too limited. Wish to have more example in PDD for community.
- Wish to have more time because the instructor was so great.
- Wish to have more training, especially during the semester break.
- Time was so limited.
- Time was too short. Need more time to understand some topics.

Table A5 Comments on Training 5 (Innovative Product Design and Development (PDD) at KKU during Nov 30-Dec 2, 2022)

The positive aspects revealed by the trainees

- Very useful for practical use.
- PDD can be applied into other projects effectively.
- New knowledge and can be applied to my research and teaching practices.
- Very effective training. I can practice and learn. I like every activity.
- I involved a lot in this training. It was fun activities.
- Hands on experienced that can be applied to local projects.
- I have more knowledge and understanding of QFD. I wish other people could have joined this training.
- I understand more of the concept because I involved in the class activities.
- Learned from real cases.
- Learned from weaknesses of product and change them through PDD.
- New approached for PDD for local community because my University is for community development.
- Improve competitiveness through PDD, market analysis, customer analysis.
- To learn to work as a team and present our idea systematically.
- Learned to use appropriate tools to develop a product to satisfy customer's' need.
- Learning with class activities helps to understand the contents more effectively.

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Recommendations from the trainees

- Time was too short.

Table A6   Comments on Training 6 (Communication and People Skills Development (CPD) at Chaiyaphum Rajabhat University during Dec 12-14, 2022)

The positive aspects revealed by the trainees

- Get practice during the training. To know myself and analyze my personality and then change it accordingly in order to communicate with other.
- Learned to communicate more effectively with practice. I can applied this to my teaching practice.
- Good for individual development. I can use this concept to analyze the learners and myself.
- I have learned that "Teacher not only teach but to be a trainer, coach, and facilitator."
- Can be applied to my teaching practice.
- Learned with practice. Active learning.
- Good for individual development.
- Help individual development in communication.
- Everyone involved in every activity.
- It was a good training. I can applied this for student development.
- Speak, communicate, present, listen. To analyze the body language of the speaker.
- Received knowledge and good experience from the training.
- I can use the technique from this training to improve my communication skills because it is very important for my teaching career
- Good knowledge. I know my point of self-improvement.
- The training was fun. I have received a lot of knowledge for personal development.
- The instructor was great, very knowledgeable. The activity flowed smoothly.
- Class actives enable the learners to learn more effectively.
-

Recommendations from the trainees

- I also would like to join other trainings.
- I would like to recommend this training to other people.
- In order to learn more effectively, I need to learn and understand more of the training media.
- The contents in training were very difficult to understand but with the guidance of the instructor it was understandable.

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- The training contents should be simplified so that audience can easily understand.
- The VDO was too long. It should be shortened.
- Extend the training time.
- The VDO movie was too long.

Table A7   Comments on Training 7 (Data Analytics (DA) at Chaiyaphum Rajabhat University during Jan 18-20, 2023)

The positive aspects revealed by the trainees

- Have more knowledge in Data Analytics.
- I can apply DA to my work and be able to transfer my knowledge.
- I can apply DA to my teaching profession and trainings for the industry.
- Use Python in DA.
- I have more knowledge in DA.
- Data analysis is useful.
- Useful for my teaching and research.
- Very useful for my teaching profession and students.
- I need further training on DA.
- Useful for my teaching and research.
- I can learn more through activities in class.
- I can apply DA to my research.
- Can be applied into real life.
- All the contents were useful for my teaching.
- Understand more of DA, classification, and prediction.
- Can be applied into my teaching and research.
- I can apply DA into my teaching and research.
- Very useful for my teaching profession.

Recommendations from the trainees

- Need more time.
- Time was so limited.
- Need more problem to practice.
- The training should focus on practicing through several tools.
- I want to learn more of using software in DA, Python and other software.
- Wish to have more time.
- The training should focus on using the tool for one period.
- I wish to learn more of software in DA.
- I wish to have more time.

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Table A8   Comments on Training 8 (Communication and People Skills Development (CPD) at
Silpakorn University, Sanam Chandra Palace during Jan 19-21, 2023)

The positive aspects revealed by the trainees

- Improve my skills.
- Presentation techniques.
- Not like other training. Not boring. Easy to understand. Suitable documents.
- Very good learning environment.
- I hope to join a course like this again.
- Good activity. Good courses. Good instructor.
- It is a good experience for me to join this course.
- I rarely used project activities in my class but after this training, I will try hard to use project activity in my class.
- The atmosphere was relaxing and open which allowed participants to express their opinions and share experiences. Yet not too relax, still stimulating and encouraging us to us to find out what we can do to win over people.
- This training gave me a lot of idea to improve my presentation. I have been teaching for 6-7 years but rarely obtained any comments from students, whether they like my class or not.
- Training with real practice through activity during the training. I can learn about myself and other people.
- I can learn about my strengths and weaknesses through the comments of my presentation and suggestion for improvement.
- Good training with real practice with constructive comments.
- Learn how to communicate with the audience effectively.

Recommendations from the trainees

- The movie in the training was too long.
- Can't think of any.
- Time was too short.
- I wish to have document in Thai.