



A Delphi Study of Challenges Affecting the Implementation of Animal Husbandry Trade Education in Delta State Secondary Schools

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Abstract

This study investigated the challenges hindering the efficient execution of the Animal Husbandry Trade Subject in secondary schools within Delta State. Utilizing the Delphi method, twenty experts in animal husbandry identified and agreed on the most significant challenges to implementation over four rounds. Initially, forty challenge items were developed in Round One, which were refined through structured questionnaires and consensus criteria in subsequent rounds. By Round Four, a total of 29 major challenges were identified, including the lack of working school farms, absence of live animals for hands-on lessons, insufficient funding, inadequate qualified teachers, poor infrastructure, scarcity of teaching materials, and limited cooperation with livestock farmers. The results indicated that these issues hinder the learning of

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practical skills and the achievement of curriculum goals. The study recommends establishing working school farms, providing timely funding, hiring and training qualified teachers, and improving infrastructure to enhance the effectiveness of animal husbandry education.

Keywords: *Animal husbandry; secondary schools; curriculum implementation; Delphi technique; practical skills; Delta State.*

1. Introduction

Animal husbandry is an important part of agricultural education and also a major factor in food security, job creation, and economic growth that is sustainable especially in a developing nation like in Nigeria. Animal husbandry is the science, art and commercial practise of rearing, feeding, housing, and raising farm animals with an intention of generating food, fibre, labour and income (Iyeke et al., 2023). Meat, milk, eggs, and hides are livestock products that have a significant contribution to human nutrition as they form a high-quality source of protein, essential minerals, and vitamins needed to live a healthy life (FAO, 2019). Animal husbandry is also a key livelihood source to rural families and small business owners in Nigeria, which decreases poverty and empowers the youth (Umunna et al., 2021).

Based on the economic and nutritional value of livestock production, the Federal Government of Nigeria introduced Agriculture, in the form of Animal Husbandry as one of the vocational trade subjects in the Senior Secondary Education Curriculum. This programme was launched under the national policy of positioning secondary education in terms of functional and descriptive can goals as well as self-sufficiency (NERDC, 2009). The Animal Husbandry Trade Subject was designed to equip students with practical skills in livestock production, processing, and management, thereby enabling them to pursue gainful employment or establish small-scale livestock enterprises after graduation (FRN, 2014). The curriculum centres on experiential learning, practical activities, and industry relevance with a high emphasis being on species that are good to produce in small scale i.e. poultry, goats and sheep, rabbits, fish and grass-cutters which are applicable in the Nigerian context (NERDC, 2011).

In Delta State, where agriculture remains a key economic activity, the effective implementation of the Animal Husbandry Trade Subject is particularly important. The state possesses favourable climatic conditions, vegetation, and market opportunities that support livestock production and agribusiness development (Delta State Ministry of Agriculture, 2020). Through effective teaching of animal husbandry at the secondary school level, students are expected to acquire entrepreneurial competencies, technical skills, and positive attitudes towards agriculture as a viable career path. This is in line with the broader objectives of Technical and Vocational Education and Training (TVET) which aims to bridge the gap between education and the labour market by producing skilled manpower relevant to industry needs (Marope et al., 2015).

Irrespective of these noble intentions, it has been indicated that introduction of the Animal Husbandry Trade Subject in secondary schools has been characterised by many huddles. It has been found that most secondary schools in the public are underprepared with the minimal facilities to conduct a practical teaching approach, including school farms, farms, livestock units, standard housing structures, and operational equipment's (Iyeke et al., 2021; Ramongwane et al., 2022). Schools that do have school farms tend to be in a state of poor condition, understocked or have no live animals at all, which makes teaching animal husbandry little more than a discussion of theory, and not acquisition of practical skills. This situation is contrary to the curriculum requirement that teaching should be mostly practical and competency based (NERDC, 2011).

Another major challenge confronting the effective implementation of the Animal Husbandry Trade Subject is the inadequacy of qualified and specialized teachers. Several studies have reported that most teachers handling animal husbandry in secondary schools are Agricultural Science teachers who were neither trained nor recruited specifically to teach vocational trade subjects (Iyeke & Ikeoji, 2019; Adetola, 2021). As a result, these teachers often lack the technical expertise, industry experience, and pedagogical skills required to deliver practical animal husbandry instruction effectively. This inadequacy limits students' exposure to real-life livestock management practices and undermines the development of employable skills.

Furthermore, lack of adequate funds, ineffective implementation of policies, lack of instructional materials, and lack of collaboration between schools and livestock industry experts have continued to impede the effective delivery of the curriculum (Ayonmike & Okeke, 2016; Ladan, 2023). In many cases, schools are not able to purchase feed, veterinary services or breeding stock, due to limited financial resources. There is also little participation of professional livestock farmers and extension officers in the training process, despite provisions in the curriculum for school - industry linkage for experiential learning (NERDC, 2011).

The relevance of Charles Prosser's Theorems to this study cannot be overestimated. Prosser emphasised that vocational education is only effective if the learners are trained under conditions which closely replicate the actual condition of work and where the instructors have successful occupational experience in the trade being taught (Prosser & Quigley, as cited in Ikeoji, 2018). This implies that effective teaching of Animal Husbandry requires functional school farms, live animals, and instructors with hands-on livestock production experience. Similarly, Kolb's Experiential Learning Theory emphasises the need for learning through concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 2014). The absence of practical exposure in many secondary schools therefore undermines the experiential learning cycle essential for skill mastery in animal husbandry.

Empirical studies have further identified challenges such as poor infrastructure, failure to access instructional technology, time allocated for practical work, safety, disease outbreaks among school livestock, and negative perception of agriculture-related careers among students (Iyeke, *et al.*, 2021, Ikeoji & Onyekwuluje, 2017, Eeswaran *et al.*, 2022, Ojumu *et al.*, 2023). These challenges collectively limit the effectiveness of the Animal Husbandry Trade Subject and weaken its capacity to achieve the intended goals of skill acquisition, entrepreneurship development, and youth employment in Delta State.

Given the strategic importance of animal husbandry to economic development and the persistent challenges confronting its implementation at the secondary school level, there is a compelling need to systematically examine the factors hindering the effective implementation of the Animal Husbandry Trade Subject in Delta State. Understanding these challenges will provide empirical evidence to guide policymakers, curriculum planners, school administrators, and teachers in improving the delivery of animal husbandry education and enhancing its contribution to sustainable development.

1.1 Statement of the Problem

The Animal Husbandry Trade Subject was introduced to equip secondary school students with practical livestock production skills and promote self-reliance. However, in Delta State, its effective implementation remains a challenge. Many schools lack functional facilities, adequate instructional materials, and qualified teachers with practical animal husbandry experience. As a result, teaching is largely theoretical, limiting students' acquisition of relevant skills. This situation undermines the objectives of the Animal Husbandry Trade Subject, thereby necessitating an investigation into the challenges facing its effective implementation in secondary schools in Delta State.

1.2 Purpose of the Study

The general purpose of the study was to determine the challenges facing the effective implementation of Animal Husbandry trade subject in secondary schools in Delta State.

2. Methodology

The study utilized the Delphi technique to reach a consensus among experts in animal husbandry and secondary school agricultural education on the challenges facing the effective implementation of the Animal Husbandry Trade Subject in Delta State. According to Delp *et al.*, cited in Green (2014), the Delphi technique is a structured group process that solicits, collates, and directs expert opinions to reach consensus. Nworie (2011) observed that the Delphi method allows experts to work toward a mutual agreement through the circulation of a series of questionnaires and the provision of controlled feedback after each round. Experts' responses may change across the rounds based on feedback and information provided by other participants (Dalkey & Helmer, 1963). The Delphi technique is appropriate for this study because it has been recognized as suitable for

identifying challenges, opportunities, and solutions in situations where expert judgment is required (Skulmoski *et al.*, 2007).

The population of the study comprised experts, such as the 722 Agricultural Science teachers teaching Animal Husbandry in secondary schools and registered livestock practitioners in Delta State, identified through Delta State Ministry of Agriculture and Natural Resources (2020). A total of twenty (20) experts were contacted via telephone to request participation and schedule a convenient time for data collection. All twenty agreed to participate in the study.

In Round One, the experts were administered an open-ended questionnaire to list the challenges they encounter in the implementation of the Animal Husbandry Trade Subject. This aligns with Schmidt's (1997) assertion that the first round of a Delphi study is primarily a brainstorming exercise. Responses were collated and summarized using frequency counts, resulting in forty (40) challenge items, as presented in Table 1.

For Round Two, the forty (40) items generated in Round One were transformed into a structured questionnaire using a four-point rating scale: Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1. Experts were asked to indicate their level of agreement with each item. The responses were analyzed using means ($\bar{X}$) and standard deviations in SPSS version 26. A cut-off mean score of 2.50 was used as the criterion for retention of items. Items with mean scores of 2.50 and above were considered adequate and retained for the next round. Based on this criterion, thirty-six (36) items were retained for Round Three, as shown in Table 2.

In Round Three, the retained thirty-six (36) items were used to design a Yes/No questionnaire to determine the experts' level of agreement with each challenge. Only fifteen (15) experts participated in this round, constituting the expert panel for consensus determination. Responses were analyzed using simple percentages, and items that attained a minimum of 60% agreement were considered to have reached consensus. At the end of this round, eighteen (18) items met the 60% criterion, as indicated in Table 3.

In Round Four, the eighteen (18) items that reached consensus in Round Three were finalized as the major challenges affecting the effective implementation of the Animal Husbandry Trade Subject in secondary schools in Delta State. These items, summarized in Table 4, represent the final consensus of the expert panel. The study concluded at this stage, in accordance with the recommendations of Delbecq *et al.* (1975) and Turoff and Linstone (1975), who stated that two to four rounds are typically sufficient to achieve consensus in a Delphi study.

3. Results

The results are presented below:

Round One

The first round of the study used an open-ended questionnaire, requesting experts to make a list of the challenges they encounter in the implementation of the Animal Husbandry Trade Subject in secondary schools in Delta State. This approach generated a variety of responses, which were subsequently summarized into 40 items. Table 1 contains a summary of the challenges identified by the twenty (20) experts.

Table 1. Round One: Challenges Facing the Effective Implementation of Animal Husbandry Trade Subject (n = 20)

S/N	Challenges	Frequency (F)
1	Lack of functional school farms for animal husbandry practicals	20
2	Absence of live animals for teaching practical animal husbandry	20
3	Inadequate funding for animal husbandry trade subject	20
4	Lack of qualified animal husbandry teachers	20
5	Teachers' lack of practical experience in livestock production	20
6	Inadequate livestock housing structures in schools	19

S/N	Challenges	Frequency (F)
7	Shortage of instructional materials and equipment	19
8	Poor maintenance of existing school farm facilities	19
9	Insufficient training and retraining opportunities for teachers	19
10	Inadequate time allocated for animal husbandry practical lessons	18
11	Overcrowded school timetable affecting practical activities	18
12	High cost of procuring and maintaining livestock for schools	18
13	Difficulty in sourcing feed for school livestock	18
14	Lack of veterinary services for school farm animals	17
15	Disease outbreaks among school livestock	17
16	Poor supervision of animal husbandry practical work	17
17	Weak collaboration between schools and livestock farmers	16
18	Limited involvement of extension officers in teaching	16
19	Poor policy implementation of the curriculum	16
20	Safety concerns during animal handling by students	15
21	Inadequate water supply for animal husbandry practicals	15
22	Students' low interest in animal husbandry as a career	15
23	Negative societal perception of agriculture-related occupations	14
24	Lack of incentives to motivate teachers	14
25	Insufficient monitoring by education authorities	14
26	Theft or vandalism of school farm animals and equipment	13
27	Lack of access to modern instructional technologies	13
28	Inadequate budgetary allocation for vocational trade subjects	12
29	Delay in release of funds for practical activities	12
30	Lack of standard guidelines for managing school livestock	12
31	Poor record-keeping practices on school farms	11
32	Inadequate storage facilities for feed and inputs	11
33	Large class size limiting effective practical instruction	11
34	Poor attitude of school administrators toward vocational subjects	10
35	Unfavourable school policies restricting farm activities	10
36	Inadequate insurance for school livestock	9
37	Poor integration of theory and practice	9
38	Lack of community support for school farm projects	8
39	Absence of partnerships with research institutions	7
40	Poor transportation for farm excursions	6

Source: Field Work (2025)

From the responses, the most frequently mentioned challenges were: item 1 (lack of functional school farms for animal husbandry practicals), item 2 (absence of live animals for teaching practical Animal Husbandry), item 3 (inadequate funding for Animal Husbandry trade subject), item 4 (lack of qualified Animal Husbandry teachers), and item 5 (teachers' lack of practical experience in livestock production). These items reflect the core infrastructural and resource-based challenges that inhibit effective practical instruction in animal husbandry in secondary schools.

Round Two

In Round Two, the experts were administered a structured questionnaire based on the forty (40) items generated in Round One. They were asked to rate their level of agreement with each item using a four-point scale: Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1. Items with mean values greater than or equal to 2.50 were considered as the key challenges affecting the effective implementation of the Animal Husbandry Trade Subject in secondary schools in Delta State. Out of the forty items, thirty-six (36) items met this criterion and were retained for further rounds. The items with the highest mean of 4.00 and standard deviation of 0.00 included: Item 1: Lack of functional school farms for animal husbandry practicals, Item 2: Absence of live animals for teaching practical animal husbandry, and Item 3: Inadequate funding for

animal husbandry trade subject. Table 2 presents the mean scores, standard deviations, and ranking of the challenges rated by the experts in Round Two.

Table 2. Round Two: Mean Scores, Standard Deviations, and Ranking of Challenges (n = 20)

S/N	Challenges	Mean ($\bar{X}$)	SD
1	Lack of functional school farms for animal husbandry practicals	4.00	0.00
2	Absence of live animals for teaching practical animal husbandry	4.00	0.00
3	Inadequate funding for animal husbandry trade subject	4.00	0.00
4	Lack of qualified animal husbandry teachers	3.95	0.22
5	Teachers' lack of practical experience in livestock production	3.90	0.31
6	Inadequate livestock housing structures in schools	3.85	0.37
7	Shortage of instructional materials and equipment	3.80	0.41
8	Poor maintenance of existing school farm facilities	3.75	0.44
9	Inadequate time allocated for animal husbandry practical lessons	3.70	0.47
10	Overcrowded school timetable affecting practical activities	3.65	0.49
11	High cost of procuring and maintaining livestock for schools	3.65	0.49
12	Difficulty in sourcing feed for school livestock	3.60	0.50
13	Lack of veterinary services for school farm animals	3.55	0.51
14	Disease outbreaks among school livestock	3.55	0.51
15	Poor supervision of animal husbandry practical work	3.50	0.60
16	Weak collaboration between schools and livestock farmers	3.50	0.60
17	Limited involvement of extension officers in teaching	3.45	0.60
18	Poor policy implementation of the curriculum	3.40	0.68
19	Safety concerns during animal handling by students	3.35	0.67
20	Inadequate water supply for animal husbandry practicals	3.30	0.73
21	Students' low interest in animal husbandry as a career	3.30	0.73
22	Negative societal perception of agriculture-related occupations	3.25	0.72
23	Lack of incentives to motivate teachers	3.20	0.77
24	Insufficient monitoring by education authorities	3.15	0.81
25	Theft or vandalism of school farm animals and equipment	3.10	0.85
26	Lack of access to modern instructional technologies	3.05	0.88
27	Large class size limiting effective practical instruction	2.95	0.94
28	Delay in release of funds for practical activities	2.90	0.97
29	Inadequate budgetary allocation for vocational trade subjects	2.85	0.99
30	Insufficient training and retraining opportunities for teachers	2.80	1.01
31	Lack of standard guidelines for managing school livestock	2.75	1.05
32	Poor record-keeping practices on school farms	2.70	1.08
33	Inadequate storage facilities for feed and inputs	2.65	1.12
34	Poor integration of theory and practice	2.60	1.15
35	Poor attitude of school administrators toward vocational subjects	2.55	1.18
36	Lack of community support for school farm projects	2.50	1.20

Items 1–36 (Mean ≥ 2.50) were retained for Round Three.

Source: Field Work (2025)

Round Three

In Round Three, a third questionnaire with Yes and No response options was developed using the thirty-six (36) items that were retained after Round Two. The questionnaire was administered to the experts to enable them indicate their level of agreement with each of the identified challenges, with the aim of determining the level of consensus reached and capturing any change in responses from the previous round. Out of the twenty (20) experts who participated in the earlier rounds, fifteen (15) experts participated in Round Three and constituted the expert panel for this round. Responses were analyzed using simple percentages, and a 60% criterion was set as the benchmark for consensus. Items that attained 60% agreement and above were regarded as the major

challenges facing the effective implementation of the Animal Husbandry Trade Subject in secondary schools in Delta State. Twenty-nine (29) items met this criterion and were retained for round 4. Table 3 presents the list of challenges assessed in Round Three.

Table 3. Round Three: Agreement Level of Challenges (n = 15)

S/N	Challenges	Yes	Agree (%)
1	Lack of functional school farms for animal husbandry practicals	15	100.0
2	Absence of live animals for teaching practical animal husbandry	15	100.0
3	Inadequate funding for animal husbandry trade subject	15	100.0
4	Inadequate budgetary allocation for vocational trade subjects	15	100.0
5	Delay in release of funds for practical activities	14	93.3
6	Lack of qualified animal husbandry teachers	14	93.3
7	Teachers' lack of practical experience in livestock production	14	93.3
8	Inadequate livestock housing structures in schools	13	86.7
9	Shortage of instructional materials and equipment	13	86.7
10	Poor maintenance of existing school farm facilities	13	86.7
11	Inadequate time allocated for animal husbandry practical lessons	12	80.0
12	Overcrowded school timetable affecting practical activities	12	80.0
13	Large class size limiting effective practical instruction	12	80.0
14	High cost of procuring and maintaining livestock for schools	12	80.0
15	Difficulty in sourcing feed for school livestock	11	73.3
16	Lack of veterinary services for school farm animals	11	73.3
17	Disease outbreaks among school livestock	11	73.3
18	Poor supervision of animal husbandry practical work	10	66.7
19	Weak collaboration between schools and livestock farmers	10	66.7
20	Limited involvement of extension officers in teaching	10	66.7
21	Inadequate water supply for animal husbandry practicals	10	66.7
22	Insufficient training and retraining opportunities for teachers	10	66.7
23	Lack of access to modern instructional technologies	9	60.0
24	Lack of standard guidelines for managing school livestock	9	60.0
25	Poor record-keeping practices on school farms	9	60.0
26	Inadequate storage facilities for feed and inputs	9	60.0
27	Poor integration of theory and practice	9	60.0
28	Safety concerns during animal handling by students	9	60.0
29	Lack of community support for school farm projects	9	60.0
30	Theft or vandalism of school farm animals and equipment	8	53.3
31	Poor attitude of school administrators toward vocational subjects	8	53.3
32	Insufficient monitoring by education authorities	6	40.0
33	Poor policy implementation of the curriculum	6	40.0
34	Lack of incentives to motivate teachers	5	33.3
35	Students' low interest in animal husbandry as a career	4	26.7
36	Negative societal perception of agriculture-related occupations	4	26.7

Items with $\geq 60\%$ agreement were retained for Round Four.

Source: Field Work (2025)

Table 4. Round Four: Major Challenges That Reached 60% Consensus Criterion

S/N	Consensus Challenges	Agree (%)
1	Lack of functional school farms for animal husbandry practicals	100.0
2	Absence of live animals for teaching practical animal husbandry	100.0
3	Inadequate funding for animal husbandry trade subject	100.0
4	Inadequate budgetary allocation for vocational trade subjects	100.0
5	Delay in release of funds for practical activities	93.3
6	Lack of qualified animal husbandry teachers	93.3
7	Teachers' lack of practical experience in livestock production	93.3
8	Inadequate livestock housing structures in schools	86.7

S/N	Consensus Challenges	Agree (%)
9	Shortage of instructional materials and equipment	86.7
10	Poor maintenance of existing school farm facilities	86.7
11	Inadequate time allocated for animal husbandry practical lessons	80.0
12	Overcrowded school timetable affecting practical activities	80.0
13	Large class size limiting effective practical instruction	80.0
14	High cost of procuring and maintaining livestock for schools	80.0
15	Difficulty in sourcing feed for school livestock	73.3
16	Lack of veterinary services for school farm animals	73.3
17	Disease outbreaks among school livestock	73.3
18	Poor supervision of animal husbandry practical work	66.7
19	Weak collaboration between schools and livestock farmers	66.7
20	Limited involvement of extension officers in teaching	66.7
21	Inadequate water supply for animal husbandry practicals	66.7
22	Insufficient training and retraining opportunities for teachers	66.7
23	Lack of access to modern instructional technologies	60.0
24	Lack of standard guidelines for managing school livestock	60.0
25	Poor record-keeping practices on school farms	60.0
26	Inadequate storage facilities for feed and inputs	60.0
27	Poor integration of theory and practice	60.0
28	Safety concerns during animal handling by students	60.0
29	Lack of community support for school farm projects	60.0

Source: Field Work (2025)

Round Four

Table 4 revealed the major challenges facing the effective implementation of the Animal Husbandry Trade Subject in secondary schools in Delta State that reached the 60% criterion of consensus. The highest consensus (100%) was obtained for item 1 (lack of functional school farms for animal husbandry practicals), item 2 (absence of live animals for teaching practical animal husbandry), item 3 (inadequate funding for animal husbandry trade subject), and item 4 (inadequate budgetary allocation for vocational trade subjects). Twenty-five (25) other items also scored 60% and above, making a total of twenty-nine (29) items that reached consensus among the respondents.

4. Discussion

The challenges identified by the study were in agreement with the findings of Iyeke *et al.* (2021) who stated that agricultural practitioners are confronted with problems ranging from lack of functional infrastructure, high cost of production inputs, and inadequate access to funding.

On the same note, Dhillon and Moncur (2023) also found that exposure to poor environmental conditions, inadequate shelter, inadequate water supply, and absence of practical resources were also major problems experienced in animal production. Challenges found by Adewumi *et al.* (2021); Ojumu, *et al.* (2023) include untimely supply of inputs, poor management skills, lack of training and retraining opportunities, high cost of production materials, and low extension contact as some of the challenges that hinder effective agricultural practises.

The findings of this study corroborate the assertions of Eeswaran, *et al.* (2022) and Okpeku, *et al.* (2019) that challenges such as large capital investment, inadequate livestock housing, limited access to live animals for practical lessons, and disease outbreaks hinder effective implementation of practical animal husbandry training. The research is also in line with Iyeke, *et al.* (2023), which found that livestock management is influenced by limited feed availability, inadequate facilities maintenance, and inadequate practical time, whereas Iyeke and Ikeoji (2020) found that health issues, such as disease outbreaks and inadequate veterinary services, inhibit successful animal production.

Furthermore, the findings are in line with Rasak *et al.* (2023) who observed that major problems include inadequate staffing, lack of qualified teachers, weak collaboration between schools and farmers, poor integration of theory and practice, and limited community support. The results of this study also highlighted issues such as overcrowded timetables, lack of modern instructional technologies, poor record-keeping, and safety concerns during animal handling, emphasizing that challenges are multifaceted and span infrastructure, human resources, funding, training, supervision, and community engagement.

5. Conclusion

The study revealed that the effective implementation of the Animal Husbandry Trade Subject in secondary schools in Delta State is constrained by several challenges. These are the inadequacy of school farms, the unavailability of live animals to teach students practically, insufficient funding, the unavailability of qualified teachers, the lack of farm infrastructure, the insufficient instructional resources, and the lack of cooperation with livestock farmers. Collectively, these challenges hinder students' practical training, reduce opportunities for skill acquisition, and compromise the effective implementation of the Animal Husbandry trade subject in secondary schools in Delta State.

6. Recommendations

The following recommendations were made:

1. Government and school authorities should establish and maintain functional school farms equipped with live animals for practical lessons.
2. Sufficient funds should be allocated and released timely for procurement of livestock, instructional materials, and maintenance of school farms.
3. Qualified animal husbandry teachers should be recruited, and existing teachers provided with regular training and retraining to improve practical competence.
4. Schools should provide adequate livestock housing, water supply, storage facilities, and other necessary infrastructure to support practical lessons.

Disclaimer (Artificial Intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Competing Interests

Authors have declared that no competing interests exist.

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