Full text open access online (Since 2009)

PRINT: ISSN 0975-1122 ONLINE: ISSN 2456-6322
Int J Edu Sci, 51(2): 32-41 (2025)
DOI: 10.31901/24566322.2024/51-02-1412

Student-Centred Pedagogical Design in Veterinary Education: A Conjoint Approach

G. Kathiravan*, J. Shilpa Shree, N. K. Sudeep Kumar and R. Thirumavalavan

Department of Animal Husbandry Statistics and Computer Applications, Madras Veterinary College, TANUVAS, Chennai 600 007
[1]ORCID: 0000-0001-6278-7150, [2]ORCID: 0000-0001-5096-3612, [3]ORCID: 0000-0002-0194-6119, [4]ORCID: 0000-0001-558-898X
E-mail: [1]<drkathir@tanuvas.org.in>, [2]<shilpashreej23@gmail.com>, [3]<sudeep66@hotmail.com>, [4]<drthiruna@gmail.com>

KEYWORDS Class Modelling. Curriculum Design. Learning. Student Preferences. Teaching

ABSTRACT The MSVE-2016 curriculum by the VCI aims to produce veterinarians with clinical competence, scientific understanding, and socio-economic awareness. Integration of social science subjects, namely, Veterinary and Animal Husbandry Extension Education (VAHEE), Livestock Economics, and Biostatistics, promotes participatory learning and data-informed decision-making. This study examined the instructional preferences of 312 undergraduate students using conjoint analysis. In VAHEE, the training approach (37.64%) and learning style (36.03%) were most valued, with virtual simulations and online modules preferred over field visits and farmer interactions. Students also favoured peer/self-assessment and continuous evaluation over year-end exams. In Livestock Economics and Biostatistics, institutional support (48.62%) and assessment (40.96%) were most influential, with digital resources and peer/self-assessment rated highly. In one-hour theory classes, interaction methods (47.3%) dominated, with preference for hands-on tasks and quizzes. Overall, students preferred interactive, digitally supported, and assessment-integrated teaching, for aligning instruction with MSVE-2016's goals.

INTRODUCTION

The Veterinary Council of India (VCI), through the Minimum Standards of Veterinary Education (MSVE) Regulations of 2016, mandates a uniform 5½-year B.V.Sc. and A.H. curriculum that integrates clinical, scientific, and socio-economic competencies. A unique strength of this curriculum is the inclusion of social science subjects, namely Veterinary and Animal Husbandry Extension Education (VAHEE), Livestock Economics, and Biostatistics, considered vital for addressing the multifaceted challenges of livestock development in India. VAHEE (3+1 credit hours) introduces students to rural sociology, communication theory, participatory extension methods, and ICT tools. Livestock Economics equips them with skills in budgeting, cost-benefit analysis, and understanding market systems, while Biostatistics trains students in research design, statistical analysis, and use of relevant software tools. These subjects collectively prepare graduates for evidence-based decision-making, community engagement, and contributions to rural development policy.

Despite their importance, these social science subjects are often perceived by veterinary students as abstract, peripheral, or less relevant compared to clinical disciplines. Traditional lecture-heavy formats, minimal digital integration, and lack of experiential learning opportunities contribute to low student engagement (Imran et al. 2025). This concern was similarly highlighted by Tamang and Reddy (2025), who found that tech-ready student teachers in Arunachal Pradesh engaged more deeply when digital tools were integrated into lessons, underscoring the importance of pedagogy that is responsive to students' demographic and contextual realities. Compounding the issue are faculty shortages and rigid academic structures that inhibit pedagogical innovation. At the same time, the learner demographic is evolving. Today's veterinary students, who are digital natives familiar

Address for correspondence:
G Kathiravan
Dept. of Animal Husbandry Statistics and Computer Applications,
Madras Veterinary College, TANUVAS, Chennai – 600007, INDIA
Tel: +91-9444107485
E-mail: drkathir@tanuvas.org.in

with platforms like YouTube, Coursera, and social media, tend to expect interactive, feedback-rich, and visually dynamic learning environments. Research underscores that such learners benefit most from active learning, digital integration, and continuous assessment strategies (Mayer 2002; Prince 2004). This shift necessitates a reevaluation of instructional practices, from focusing solely on content delivery to emphasising learning outcomes and engagement (Noyes et al. 2022).

Moreover, each social science subject presents distinct pedagogical demands. Extension Education benefits from interactive tools like simulations and role-plays to teach communication and outreach. Livestock Economics requires case-based reasoning and application of real-world data, while Biostatistics relies on stepwise, quantitative instruction and structured feedback. Student goals also vary, wherein those aspiring for research or administrative roles may prioritise economics and statistics, whereas students inclined toward fieldwork may value experiential or simulation-based formats. Yet, instruction in these courses often remains undifferentiated, failing to accommodate either the unique epistemological nature of each subject or the diversity of learner objectives (Lakhno 2022). Tran and Nagirikandalage (2025) also argued that applying a uniform teaching approach across diverse subjects can reduce student engagement and hinder the development of varied cognitive skills, particularly in professional education contexts. There is, therefore, a pressing need for a student-centred, adaptive pedagogical model aligned with both content-specific and learner-specific needs.

The structure of one-hour theory classes, a fundamental unit in the veterinary curriculum (for example, a 3+1 credit pattern entails three hours of theory and one of practicals per week), also significantly influences student learning outcomes. Within the constraints of packed timetables, design choices such as lecture duration, assignment frequency, use of multimedia, and learning material format can affect student attention, workload, and knowledge retention. Shorter lectures might support better focus but limit content depth, more frequent assessments may enhance learning but also raise student burden. Understanding how students weigh these elements is critical for creating more effective learning environments. Conjoint analysis, a technique from decision science, offers a rigorous method to investigate these preferences and optimise instructional design.

Conjoint analysis, rooted in consumer behaviour research (Green and Srinivasan 1978), has gained traction in education for evaluating preferences in learning formats, assessment methods, and instructional design (Utami et al. 2024). It presents respondents with hypothetical scenarios comprising varied attribute combinations to elicit the relative importance (or utility) they assign to each feature. Despite its growing use in health and education research, its application in Indian veterinary education remains limited. Given the increasing call for evidence-based curriculum development, applying conjoint analysis in this context can yield actionable insights into student expectations and preferences.

The theoretical underpinnings of student learning preferences can be explained through several established educational frameworks. Constructivist theory posits that learners construct knowledge actively through engagement and peer interaction rather than passively absorbing content (Cooperstein and Kocevar Weidinger 2004; Mensah 2015). Kolb's (1984) Experiential Learning Theory emphasises the cyclical nature of learning through experience, reflection, and application, offering a rationale for students' preference for simulations and real-world tasks, especially in Extension Education. Andragogy provides additional context, highlighting adult learners' preferences for autonomy, relevance, and flexible learning formats. Collectively, these theories inform the interpretation of student preferences and underscore the need for learner-centred, context-aware curriculum design in veterinary education.

Objectives

This study examines the gap between the intended learning goals of veterinary social science subjects and the actual experiences of students under the MSVE-2016 curriculum. It has two main objectives:

- To investigate veterinary students' preferences for teaching methods used in Extension Education, Livestock Economics, and Biostatistics, and how these influence their interest and understanding.
- To evaluate how students respond to specific features of a one-hour classroom ses-

sion, such as lecture length, assessment type, interaction style, and the format of learning materials.

Conjoint analysis was used to understand how students weigh different aspects of teaching and to identify combinations that support effective and engaging learning. The findings aim to support curriculum planners, teachers, and decision-makers in improving classroom practices and aligning instruction with students' learning needs.

METHODOLOGY

This section describes the design and execution of two conjoint analysis studies aimed at modelling the pedagogical preferences of veterinary students. The study was conducted at Madras Veterinary College, Tamil Nadu Veterinary and Animal Sciences University, during June 2025, among undergraduate veterinary students who had either completed or were currently enrolled in social science courses. Of the 346 students who responded, 312 provided complete responses and were included in the final analysis, resulting in a response rate of 90.2 percent. The participants represented a diverse mix in terms of gender, geographic origin (rural/urban), and academic performance. However, since no significant differences in preference patterns were observed across these demographic subgroups, the data are not reported separately. The study employed conjoint analysis to examine how students make trade-offs among competing educational features by evaluating entire teaching profiles, each consisting of a combination of instructional attributes.

Traditional surveys often capture general attitudes toward teaching methods but fail to elicit how students make trade-offs among competing features. Conjoint analysis overcomes this limitation by requiring respondents to evaluate realistic, holistic scenarios, thereby approximating real-world decision-making. Previous applications of conjoint methods in medical education have successfully modelled preferences for clinical placement design, OSCE formats, and faculty feedback styles (Al-Omari et al. 2022; Feubli et al. 2024). This study extends that utility to veterinary education and shows that such models can uncover not only which attributes students prefer, but how much they value each, allowing for prioritisation in curriculum planning. To achieve this, three separate orthogonal designs were generated using IBM SPSS Statistics v23.0.

Conjoint 1 investigated the preferences specific to social science subjects. As shown in Table 1, it included four attributes for Veterinary Extension Education, and three attributes each for Livestock Economics and Biostatistics, with participants ranking nine hypothetical profiles for each subject. Conjoint 2, as depicted in Table 2, focused on one-hour theory class design, comprising five attributes (lecture length, material format, assignment frequency, multimedia use, and delivery mode) across 16 profiles.

Surveys were designed following standard conjoint analysis protocols (Green and Srinivasan 1978; Louviere et al. 2000) and were pilot-tested for clarity and relevance. Several steps were taken to minimise bias. The survey was administered in a standardised manner during class to ensure uniform understanding. Responses were anonymised, and students were assured that participation would not affect their grades or standing. The use of rank-order conjoint profiles minimised social desirability bias, as no single option could be perceived as "correct". Despite these measures, potential biases such as acquiescence or non-response bias cannot be fully ruled out.

A sample size of over 300 participants was considered adequate based on previous studies employing conjoint analysis in educational research (Al-Omari et al. 2022; Feubli et al. 2024). Although no formal a priori power calculation was performed, the number of complete responses (n = 312) provided robust subgroup comparisons and model stability in conjoint estimation. Post hoc assessment of internal consistency further confirmed the adequacy of the sample.

Conjoint analysis was conducted using the Conjoint Module of IBM SPSS v23.0. The software estimated part-worth utilities (preference scores) for each level within an attribute and computed relative importance scores to rank the attributes. Model fit was evaluated using Pearson's R and Kendall's Tau, both of which showed high correlation between observed and predicted preferences, indicating excellent internal consistency and predictive validity. No missing data imputation was required, as only complete responses were included in the final dataset.

Table 1: Attribute and level design for Social Science Conjoint Study

Discipline	*Attribute*	*Levels*	
Veterinary Extension Education	Training Approach	(1)	Hands-on farmer interaction
		(2)	Theoretical extension models
		(3)	Virtual extension simulations
	Learning Style	(1)	Field visits, case studies;
		(2)	Classroom lectures, textbooks; and
		(3)	Online modules, Simulations
	Assessment Type	(1)	Continuous evaluation (quiz)
		(2)	Year-end exams; and
		(3)	Peer and self-assessment
	Institutional Support	(1)	Faculty mentorship;
		(2)	Digital resource availability; and
		(3)	Industry collaboration (guest lecture)
Livestock Economics and Biostatistics	Learning Style	1)	Theory-based learning;
		(2)	Case-based, practical; and
		(3)	Data-driven (Software)
	Assessment Type	(1)	Continuous evaluation (quiz);
		(2)	Year-end exams; and
		(3)	Peer and self-assessment
	Institutional Support	(1)	Faculty mentorship;
		(2)	Digital resource availability; and
		(3)	Industry collaboration (guest lecture)

Table 2: Attribute and level design for theory class Conjoint Study

Attribute	*Levels*
Lecture Duration	25–35 minutes; 40–50 minutes; More than 50 mins
Learning Material	Class notes and dictation; Books and printed notes; Digital notes
Teaching Aids	Chalkboard Only; Multimedia (video/images)
Interaction Style	Students' seminar; Quiz-based interaction; Hands-on activities
Assignment Frequency	No assignment; Monthly assignment; Bi-monthly assignment

RESULTS

This section reports the results of three conjoint models estimating student preferences for (i) Veterinary Extension Education, (ii) Livestock Economics and Biostatistics, and (iii) general theory class design. Based on rankings from 312 veterinary undergraduates, all models showed high predictive accuracy, with significant ($p = 0.001$) Pearson's R and Kendall's Tau values.

Preferences in Veterinary Extension Education

The first conjoint model examined student preferences for instructional design in Veterinary Extension Education, using four attributes of learning style, training approach, assessment method, and institutional support, each with two to three levels. The results in Table 3 showed a strong student inclination toward virtual learning environments and interactive instructional formats.

Training approach was the most influential attribute, accounting for 37.64 percent of the variance. Students clearly preferred virtual extension simulations over theoretical models, reflecting the perceived value of experiential, scenario-based learning. Learning style ranked second in importance (36.03%) with the highest utilities assigned to online modules and simulations, followed by traditional classroom lectures and textbooks. Field visits and case studies were least preferred, possibly due to their variable quality or logistical complexity within the curriculum.

The assessment method contributed 23.17 percent to the overall preference structure. Formats such as peer and self-assessment were favoured over purely summative evaluations, consistent with broader pedagogical shifts toward formative, participatory evaluation. Institutional support had a relatively minor influence (3.16%), although students indicated a mild preference for digital extension libraries over conventional manuals.

Table 3: Part-worth estimates and importance of attributes for Social Sciences delivery

Attributes	*Levels*		*Veterinary extension education*		*Livestock economics and biostatistics*	
			Utility	*RI (%)*	*Utility*	*RI (%)*
LearningStyle	1)	Field visits, case studies	□0.471	36.03	–	–
	2)	Classroom lectures, textbooks	+0.203		–	–
	3)	Online modules, Simulations	+0.268		–	–
	1)	Theory-based learning	–		“0.047	10.42
	2)	Case-based, practical	–		□0.020	
	3)	Data-driven (Software)	–		+0.068	
Training Approach	1)	Hands-on farmer interaction	□0.364	37.64	–	
	2)	Theoretical extension models	“0.044		–	
	3)	Virtual extension simulations	+0.408		–	
AssessmentMethod	1)	Continuous evaluation (quiz)	+0.150	23.17	□0.098	40.96
	2)	Year-end exams	“0.313		“0.177	
	3)	Peer and self-assessment	+0.163		+0.275	
SupportMechanism	1)	Faculty mentorship	“0.028	3.16	“0.095	48.62
	2)	Digital resource availability	+0.036		+0.315	
	3)	Industry collaboration (guest lecture)	“0.008		“0.221	

RI - Relative Importance

Simulated profile predictions reinforced these findings. Teaching formats combining virtual simulations, online learning content, formative assessment, and digital support tools consistently attracted higher preference scores. Overall, the results point to a clear demand for modernised, digitally supported, and learner-centred approaches in the teaching of Veterinary Extension Education.

Preferences in Livestock Economics and Biostatistics

The second conjoint model explored student preferences in Livestock Economics and Biostatistics, which are more analytically intensive than Extension Education. The model included three attributes of teaching method, evaluation strategy, and academic support. Results reflected students' need for structured, supportive, and digitally accessible learning environments suited to technical content.

Academic support emerged as the strongest predictor of preference, contributing 48.62 percent to overall variance. Students favoured digital archives of lectures and notes over structured tutorials or mentorship, while library-based resources received negative utility scores, suggesting limited value for static, text-heavy formats in technical subjects.

Evaluation strategy accounted for 40.96 percent of preference variation. Peer and self-assessment ranked highest, closely followed by periodic assessments. In contrast, year-end exams were least preferred, reinforcing the shift toward formative, feedback-oriented evaluation over high-stakes testing. Although teaching method was the least influential attribute (10.42%), students still showed clear preferences of online tools for economic and statistical analysis were rated highest, followed by case discussions. Classroom lectures were least favoured, which may be not due to content rejection, but due to a preference for interactive or digitally mediated delivery.

The most preferred profile, combining online tools, peer/self-evaluation, and digital academic support, captured nearly 45 percent of the simulated preference share. These results underline the importance of autonomous learning tools, continuous assessment, and structured digital resources in enhancing student experience in quantitative subjects.

Preferences in One-hour Theory Class Design

The third conjoint model examined students' preferred design for a typical one-hour theory class, regardless of subject. Five attributes were tested for interaction style, assignment frequency, lecture duration, teaching aids, and learning material format. Results, shown in Table 4, again underscored the central role of interactive engagement

Table 4: Part-worth estimates and importance of attributes for theory class

Attribute	*Level*	*Part-worth utility (B)*	*Relative importance (%)*
Lecture Duration	30–40 minutes	-0.068	12.15
	40–50 minutes	+0.059	
	More than50 minutes	+0.009	
Learning Material	Class notes and dictation	-0.030	5.34
	Books and printed notes	+0.026	
	Digital notes	+0.004	
Teaching Aids	Chalk and talk	-0.061	11.72
	Multimedia	+0.061	
Interaction Style	Students' seminar	-0.291	47.31
	Quiz-based interaction	+0.087	
	Hands-on activities	+0.204	
Assignment Frequency	No assignment	-0.131	23.49
	Monthly assignment	+0.017	
	Bi-monthly assignment	+0.114	

in shaping student satisfaction. Interaction style was the most influential attribute, contributing 47.31 percent to overall preference. Students strongly favoured classes that incorporated hands-on activities and quizzes over traditional lectures, reflecting a clear preference for active learning and real-time feedback.

Assignment frequency ranked second in importance (23.49%), with bi-monthly assignments preferred over weekly ones. This suggests a student preference for balanced reinforcement, supporting consolidation without overload, consistent with cognitive load theory. Lecture duration explained 12.15 percent of variance. Classes lasting 40-50 minutes were rated highest, offering sufficient time for depth without fatigue. Teaching aids (11.72%) and learning material format (5.34%) also influenced preferences. Multimedia aids such as videos or animations, were clearly preferred over chalkboard-based delivery. Interestingly, printed materials were favoured slightly over digital ones, possibly due to ease of note-taking and perceived reliability.

The most preferred configuration featured interactive activities, bi-monthly assignments, a 40-to-50-minute duration, multimedia aids, and printed handouts. These results highlight the enduring value of well-structured, interactive, and resource-rich sessions, even within traditional lecture formats.

DISCUSSION

This study aimed to model the pedagogical preferences of veterinary undergraduate students using conjoint analysis, drawing on profile-ranking data from three contexts of (i) Veterinary Extension Education, (ii) Livestock Economics and Biostatistics, and (iii) general one-hour theory class design. The results offer compelling evidence that students across these domains prefer pedagogical formats that are digitally enabled, interactive, formative in nature, and supported by institutional scaffolding. These preferences not only reflect evolving learner expectations but also align with contemporary theories of educational psychology (Duterte 2024). Recent research, including the works of Garay and Orjuela-Segura (2023) and O'Regan et al. (2023), has reinforced that veterinary students are progressively drawn to immersive, technology-enhanced learning environments that promote both practical skill development and the shaping of their professional identity.

Preferences in Social Science Subjects

The analysis of Veterinary Extension Education preferences revealed that students strongly value training approaches and learning styles that promote immersion and engagement. Virtual extension simulations and online modules were consistently rated higher than traditional lectures and field visits. Hu and Xiao (2025) further supported this view through their review of deep learning and simulation-based technologies in veterinary diagnostics and education, emphasizing how these tools can realistically reproduce complex clinical and field situations within structured, feedback-oriented settings. Although field experiences have

historically been considered a cornerstone of extension pedagogy, their relatively low preference in this study may be due to practical limitations such as inconsistent quality, lack of real-world complexity, or insufficient faculty facilitation (Veenema 2024). In contrast, simulations offer the ability to replicate complex outreach scenarios in a controlled, feedback-rich environment, aligning with Kolb's (1984) experiential learning theory and the principles of constructivism.

Similarly, peer and self-assessment formats were favoured over summative evaluations. This finding aligns with prior research suggesting that formative assessments promote learner autonomy, reduce performance anxiety, and enhance metacognitive skills (Kibble 2017; Nicol and Macfarlane Dick 2006). The AAHA (2025) similarly observed that veterinary programs are increasingly adopting competency-based, formative approaches, allowing students to monitor their development more effectively and gain greater confidence in their skills. This shift also mirrors students' growing preference for ongoing, constructive feedback over traditional high-stakes evaluations. The relatively low importance placed on institutional support in Extension Education suggests that students in this subject may not perceive traditional manuals or static resources as particularly valuable unless paired with engaging instruction.

In contrast, students emphasised the importance of academic support and evaluation strategy for learning Livestock Economics and Biostatistics. These subjects are often seen as cognitively demanding and require reinforcement through structured learning tools. The strong preference for digital archives and tutorial/mentorship systems suggests a recognition of the need for scaffolded or guided learning. Garay and Orjuela-Segura (2023) found that when digital tools were aligned with students' practical and visual learning preferences, their understanding of STEM concepts improved significantly. The study also indicated that students preferred flexible learning options that allowed them to review course materials at their own pace. Peer/self-evaluation and periodic assessments were again preferred over year-end examinations, consistent with the broader trend toward continuous learning and iterative performance feedback (McKnight and Ibeagha-Awemu 2019). Interestingly, in this model, the teaching method itself was the least influential attribute. This finding does not necessarily imply that the instructional mode is unimportant, but rather that students prioritise how they are assessed and supported over how content is initially delivered. In analytical disciplines, where conceptual understanding often requires repeated exposure and guided practice, support structures may be more critical than delivery format alone (Choo et al. 2011). This finding also aligns with the observations of Bok et al. (2025), who noted that in competency-based veterinary education, the roles of assessment committees and structured mentorship play a greater influence on student development than the mode of instruction itself-particularly in analytical disciplines where consistent feedback and professional guidance are key to learner growth.

Preferences in Theory Class Design

In the context of one-hour theory classes, interaction style emerged as the dominant factor influencing student preferences. Hands-on sessions and quiz-based interactions were clearly favoured over passive lecture formats. This reinforces the pedagogical value of active learning, a well-documented approach shown to improve student engagement, retention, and critical thinking (Freeman et al. 2014; Prince 2004). Koç and Kanadli (2025) demonstrated that interactive learning environments-such as augmented reality, virtual simulations, and digital games-can meaningfully enhance students' engagement and understanding in science education. Their study further showed that these methods are most effective when the content is tailored to specific species contexts and aligned with the individual learning pace of students. Students tended to participate more actively, ask questions, and retain information better when the class structure encouraged both cognitive and hands-on involvement.

The preference for bi-monthly over weekly assignments suggests a desire for pacing and reinforced learning. Students appear to value time for reflection and application, which bi-monthly assignments afford, over the stress or redundancy that weekly assignments might impose. This finding aligns with the spacing effect in cognitive psychology, which holds that spaced repetition improves long-term retention compared to massed practice (Cepeda et al. 2006).

Multimedia aids were favoured over chalkboard only instruction, indicating that students appreciate visual and auditory stimulation alongside textual explanation. Videos, animations, and graphical demonstrations are particularly effective in conveying complex veterinary concepts, especially those involving anatomical, physiological, or procedural content. This focus on technology-enhanced, experiential learning was also highlighted at the 2025 Vice-Chancellors' Conclave, organised by the Indian Poultry Equipment Manufacturers Association (IPEMA), Poultry India, and Maharashtra Animal and Fishery Sciences University (MAFSU), which stressed the need to align veterinary education with industry demands through digital tools and skill-focused curricula tailored to India's animal husbandry and poultry sectors (IPEMA 2025). At the same time, the modest preference for printed notes over digital slides suggests that students still value tangible materials for annotation, revision, and offline study, particularly where digital infrastructure may be inconsistent.

Theoretical Alignment of the Study

The preferences expressed in this study are congruent with established learning theories. The preference for simulations, peer-assessment, and digital scaffolding supports a constructivist paradigm, where learning is understood as a process of knowledge construction rather than transmission (Thomas 2023). Similarly, the inclination toward self-paced resources and peer evaluation reflects andragogical principles (Knowles 1970), which emphasise the autonomy and self-direction of adult learners. Moreover, the emphasis on interactivity, choice, and formative assessment reflects a shift towards the learner, that is, the capacity of students to influence and control aspects of their learning experience. Recent studies (Bok et al. 2025; AAHA 2025) show that veterinary students increasingly value agency, flexibility, and relevance in learning. Bok et al. highlight the role of assessment committees and structured mentorship in supporting autonomy, while AAHA points to competency-based, formative models that let students guide their own progress—emphasizing the need for learner-centred design. In today's veterinary education, where students must evolve from passive learners to active problem-solvers and communicators, designing for student agency is both timely and essential.

CONCLUSION

This study used conjoint analysis to understand veterinary students' preferences for teaching methods in social science subjects and one-hour theory classes. The findings reveal a strong preference for interactive, digitally supported, and assessment-driven learning experiences. Students consistently favoured simulations, online modules, peer evaluation, and digital resources over traditional lectures, end-term exams, and library-based support.

In Extension Education, virtual simulations and online materials were preferred, with peer assessment emerging as especially valued. In Livestock Economics and Biostatistics, students prioritised access to digital content and structured support, along with regular, formative assessments.

Preferences for theory class design included hands-on interaction, short quizzes, bi-monthly assignments, and the use of multimedia. Even modest changes, like extending lectures to 40-50 minutes or adding reflective tasks, were seen as beneficial.

Overall, the study highlights the need for subject-specific, student-informed teaching approaches that enhance engagement, learning, and readiness for veterinary practice.

RECOMMENDATIONS

Pedagogical Implications

The findings offer practical guidance for faculty, curriculum developers, and policymakers aiming to improve veterinary education through student-centred teaching. Across subjects, students clearly preferred interactive, digitally supported learning with regular, formative assessments, suggesting the need to move beyond lecture-heavy and exam-focused teaching.

In Veterinary Extension Education, students responded well to virtual simulations and case-based online modules. Adding role-play, scenario-based tasks, and peer assessment can strengthen real-world communication skills. Faculty training and investment in digital tools and platforms will be key to supporting this shift.

In Livestock Economics and Biostatistics, students favoured guided learning with access to structured digital materials, worked examples, and mentorship. Step-by-step video guides, interac-

tive datasets, and flexible assessments like online quizzes and peer reviews can help improve understanding and engagement.

For theory classes, students preferred short, interactive sessions with quizzes, discussions, and multimedia. Combining digital tools with printed materials ensures flexibility, especially where internet access is limited. A subject-specific, flexible approach to teaching is essential for meeting diverse learning needs.

REFERENCES

Al-Omari B, Farhat J, Ershaid M 2022. Conjoint analysis: A research method to study patients' preferences and personalize care. *Journal of Personalized Medicine*, 12(2): 274. https://doi.org/10.3390/jpm12020274

AAHA 2025. American Animal Hospital Association - Adding in Some Fun: Gamifying Veterinary Education. Trends Mag, Sep 2025. From <https://www.aaha.org/trends-magazine/publications/adding-in-some-fun-gamifying-veterinary-education/> (Retrieved on 25 October 2025)

Bok HGJ, van der Vleuten CPM, de Jong LH 2021. "Prevention Is Better Than Cure": A plea to emphasize the learning function of competence committees in programmatic assessment. *Frontiers in Veterinary Science*, 8: 638455. https://doi: 10.3389/fvets.2021.638455

Cepeda NJ, Pashler H, Vul E, Wixted JT, Rohrer D 2006. Distributed practice in verbal recall tasks: A review and quantitative synthesis. *Psychological Bulletin*, 132(3): 354-380. https://doi.org/10.1037/0033-2909.132.3.354

Choo SSY, Rotgans JI, Yew EHJ, Schmidt HG 2011. Effect of worksheet scaffolds on student learning in problem-based learning. *Advances in Health Sciences Education*, 16(4): 517-528. https://doi.org/10.1007/s10459-011-9288-1

Cooperstein SE, Kocevar Weidinger E 2004. Beyond active learning: A constructivist approach to learning. *Reference Services Review*, 32(2): 141-148. https://doi.org/10.1108/00907320410537658

Duterte JP 2024. Effective pedagogical strategies for digital learners. *EPRA International Journal of Research and Development (IJRD)*, 50-55. https://doi.org/10.36713/epra18211

Feubli P, MacKevett D, Schwarz J 2024. Hybrid teaching and learning: A conjoint analysis of student preferences in online and onsite scenarios. *Journal of Computer Assisted Learning*, 40(2): 761-774. https://doi.org/10.1111/jcal.12913

Freeman S, Eddy SL, McDonough M, Smith MK, Okoroafor N, Jordt H, Wenderoth MP 2014. Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, 111(23): 8410-8415. https://doi.org/10.1073/pnas.1319030111

Garay JF, Orjuela-Segura J 2023. Learning Styles Theory: Could students' learning preferences make STEM subjects easier to learn? *International Journal of Educational Sciences,* 40(1-3): 24-37. https://doi.org/10.31901/24566322.2023/40.1-3.1263

Green PE, Srinivasan V 1978. Conjoint analysis in consumer research: Issues and outlook. *Journal of Consumer Research*, 5(2): 103-123. https://doi.org/10.1086/208721

Hu J, Xiao W 2025. What are the influencing factors of online learning engagement? A systematic literature review. *Frontiers in Psychology,* 16: Article 1542652. https://doi.org/10.3389/fpsyg.2025.1542652

Imran M, Almusharraf N, Abbasova MY 2025. Digital learning transformation: A study of teachers' post-Covid-19 experiences. *Social Sciences and Humanities Open*, 11: 101228. https://doi.org/10.1016/j.ssaho.2024.101228

IPEMA 2025. Vice-Chancellors' Conclave Highlights Need for Technology-Enhanced Veterinary Education. From <https://thepoultrypunch.com/2025/07/ipema-and-poultry-india-host-vice-chancellors-conclave-on-veterinary-education-and-industry-collaboration/> (Retrieved on 25 October 2025)

Kibble JD 2017. Best practices in summative assessment. *Advances in Physiology Education*, 41(1): 110–119. https://doi.org/10.1152/advan.00116.2016

Knowles MS 1970. *The Modern Practice of Adult Education: From Pedagogy to Andragogy.* Prentice Hall Regents.

Koç A, Kanadli S 2025. Effect of interactive learning environments on learning outcomes in Science Education: A network meta analysis. *Journal of Science Education and Technology,* 34: 681-703. https://doi.org/10.1007/s10956-025-10202-7

Kolb DA 1984. Experiential Learning: Experience as the Source of Learning and Development. Prentice Hall. From <http://www.learningfromexperience.com/images/uploads/process-of-experiential-learning.pdf> (Retrieved on 25 October 2025).

Lakhno M 2022. Reimagining development in higher education. *Journal of Praxis in Higher Education*, 4(2): 122-127. https://doi.org/10.47989/kpdc320

Louviere JJ, Hensher DA, Swait JD, Adamowicz W 2000. *Stated choice methods.* Cambridge University Press. https://doi.org/10.1017/CBO9780511753831

Mayer RE 2002. Multimedia learning. *Advances in Psychology*, 85-139. https://doi.org/10.1016/S0079-7421(02)80005-6

McKnight L, Ibeagha-Awemu E 2019. Modeling of livestock systems to enhance efficiency. *Animal Frontiers*, 9(2): 3-5. https://doi.org/10.1093/af/vfz011

Mensah E 2015. Exploring constructivist perspectives in the college classroom. *Sage Open*, 5(3). https://doi.org/10.1177/2158244015596208

Nicol DJ, Macfarlane Dick D 2006. Formative assessment and self regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education*, 31(2): 199–218. https://doi.org/10.1080/03075070600572090

Noyes JA, Carbonneau KJ, Matthew SM 2022. Comparative effectiveness of training with simulators versus traditional instruction in veterinary education: Meta-analysis and systematic review. *Journal of Veterinary Medical Education*, 49(1): 25-38. https://doi.org/10.3138/jvme-2020-0026

O'Regan C, Walsh N, Hall T, Mannion G 2023. Conceptualising student engagement as a theoretical framework for Innovative Higher Education Practices- A literature review. *All Ireland Journal of Higher Education,* 15(2): 1

- 21 https://ojs.aishe.org/index.php/aishe-j/article/view/743/1081
Prince M 2004. Does active learning work? A review of the research. *Journal of Engineering Education*, 93(3): 223-231. https://doi.org/10.1002/j.2168-9830.2004.tb00809.x
Tamang R, Reddy NA 2025. Tech-ready student teachers: Demographic insights into digital empowerment in Arunachal Pradesh, India. *International Journal of Educational Sciences*, 50(1): 23–32. https://doi.org/10.31901/24566322.2025/50.01.1411
Thomas S 2023. Assessment and evaluation of learning in a constructivist paradigm. *International Journal for Multidisciplinary Research*, 5(2). https://doi.org/10.36948/ijfmr.2023.v05i02.1795
Tran TT, Nagirikandalage P 2025. Insights into enhancing student engagement: A practical application of blended learning. *The International Journal of Management Education,* 23(2): Article S1472811725000370. https://doi.org/10.1016/j.ijme.2025.101167
Utami SD, Masiah M, Firdaus L, Primawati SN, Royani I 2024. A conjoint analysis of student preferences for teaching and learning process. *Biocaster: Jurnal Kajian Biologi*, 4(3): 122-134. https://doi.org/10.36312/biocaster.v4i3.303
Veenema NJ, Hierck BP, Bok HGJ, Salvatori DCF 2024. Links between learning goals, learning activities, and learning outcomes in simulation-based clinical skills training: A systematic review of the veterinary literature. *Frontiers in Veterinary Science*, 11. https://doi.org/10.3389/fvets.2024.1463642

Paper received for publication in July, 2025
Paper accepted for publication in September, 2025