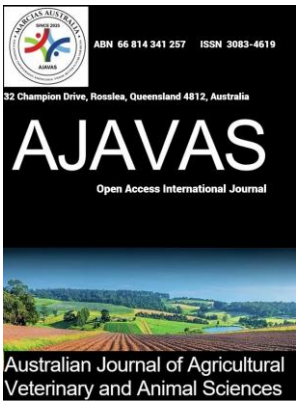

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Development of the ASVM digital dictionary for English teaching and self-directed learning in animal science and veterinary medicine

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ABSTRACT: *In the context of globalisation and digital transformation in higher education, enhancing English for Specific Purposes (ESP) skills among students in agricultural sciences, particularly in Animal Science and Veterinary Medicine, has become increasingly essential. However, the absence of specialised and contextually relevant learning tools poses a significant barrier to accessing international academic resources. This paper presents the development process, technical features, and application potential of the Animal Science and Veterinary Medicine (ASVM) Dictionary, a bilingual digital glossary designed and implemented by a research team at Can Tho University. With over 10,000 English–Vietnamese terms, including pronunciation, illustrative images, and real-time search functionality, the ASVM Dictionary not only facilitates accurate terminology acquisition but also promotes self-directed learning and digital engagement. Results indicate that there were more than 80,000 website visits and 2,000 app downloads, reflecting high practical interest and adoption. The paper also compares the ASVM Dictionary with traditional reference materials, analyses its integration into current ESP curricula, and proposes future development directions, such as incorporating artificial intelligence and expanding interdisciplinary applications.*

Keywords: ASVM specialised dictionary, English for specific purposes, animal science and veterinary medicine, digital learning tools, computer-assisted language learning

Highlights

- Developed ASVM - a specialised digital dictionary for animal and veterinary sciences
- Integrates pronunciation, definitions, and visual aids for over 1,200 technical terms
- VB.NET and MS Access were used to develop an interactive ESP self-learning tool.

1.0 Introduction

In the context of globalisation and the rapid digital transformation of higher education, enhancing competence in English for Specific Purposes (ESP) has become a critical requirement for students in science-based disciplines. In particular, Animal Science and Veterinary Medicine are fields characterised by a vast, highly specialised, and continuously evolving body of technical terminology, closely associated with advances in biological sciences, biotechnology, animal health, and livestock production systems. Proficiency in professional English is therefore essential not only for academic learning, but also for accessing international scientific literature, participating in global research networks, and meeting professional practice standards.

Despite this growing demand, practical experience in many Vietnamese higher education institutions indicates that students majoring in Animal Science and Veterinary Medicine continue to face substantial difficulties when engaging with English-language academic materials. One of the most persistent challenges lies in the understanding, pronunciation, and contextual use of specialised terminology, particularly when no appropriate bilingual reference tools are available. Conventional printed dictionaries are often outdated, lack multimedia support, and fail to reflect the contextualised usage of terms within specific sub-disciplines such as ruminant nutrition, veterinary pathology, reproduction, or animal biotechnology. As a result, students frequently rely on general-purpose translation tools, which may lead to inaccuracies and misunderstandings in technical contexts.

In Vietnam, although several English textbooks and glossaries related to agriculture, animal science, and veterinary medicine have been published, most remain in printed format and are limited in scope, lag behind in update frequency, and interactivity. Furthermore, these resources rarely integrate pronunciation guides, visual illustrations, or digital search functions that support modern, learner-centered pedagogical approaches. The absence of a specialised, bilingual, and digitally accessible dictionary has therefore created a significant gap in ESP teaching and self-learning for Animal Science and Veterinary Medicine students.

To address this gap, a research group at Can Tho University, Vietnam, initiated the development of the Animal Science and Veterinary Medicine (ASVM) Digital Dictionary, a web-based and mobile-based learning platform designed specifically to support ESP instruction and autonomous learning. The ASVM Dictionary provides English–Vietnamese definitions of specialised terminologies, accompanied by phonetic transcriptions, standard pronunciations, illustrative images, and real-time search functionality. Beyond simple vocabulary lookup, the platform is designed to foster active learning, digital engagement, and community contribution under academic supervision. Preliminary efforts toward developing a specialised English–Vietnamese terminology resource for animal science and veterinary medicine have been reported previously (Ho et al., 2022).

The present study aims to describe the development process, technical features, and educational application potential of the ASVM Digital Dictionary. In addition, the study evaluates initial usage statistics and user engagement, compares the ASVM Dictionary with traditional reference materials, and discusses its potential integration into existing ESP curricula for Animal Science and Veterinary Medicine programs in Vietnam. Finally, future development directions, including artificial intelligence integration and interdisciplinary expansion, are proposed to enhance the sustainability and scalability of the platform.

2.0 Materials and methods

2.1 Development process and technical features of the ASVM dictionary

The ASVM Digital Dictionary was developed between June 2019 and April 2022 through a collaborative effort between the Faculty of Animal Science and the School of Information and Communication Technology, Can Tho University, Vietnam. The initiative originated from an internal academic need to standardise, systematise, and modernise specialised terminology used in English for Specific Purposes (ESP) courses and professional training in Animal Science and Veterinary Medicine.

2.1.1 Data Sources and Terminology Compilation

The lexical database of the ASVM Dictionary was compiled from a wide range of authoritative and peer-recognized academic sources, ensuring terminological accuracy and disciplinary relevance. Key reference materials included Black's Student Veterinary Dictionary (Boden and Andrews, 2017), Veterinary Medical Terminology Guide and Workbook (Taibo, 2019), the English–Vietnamese Dictionary of Animal Science and Veterinary Medicine (Cao et al., 2013), and agricultural glossaries published by Can Tho University, Vietnam (Oe & Vo, 1997, 1998). In addition, terminology was cross-checked against specialised ESP textbooks for animal science and veterinary medicine used in Vietnamese higher education curricula (Nguyen et al., 2023).

All terms were reviewed and curated by subject-matter experts in animal nutrition, animal physiology, veterinary medicine, and livestock production to ensure semantic precision and contextual appropriateness. Priority was given to terms frequently encountered in scientific publications, teaching materials, and professional practice, particularly in sub-fields such as ruminant nutrition, animal reproduction, veterinary pathology, animal health management, and feed technology.

2.1.2 Dictionary Structure and Content Design

The current version of the ASVM Dictionary contains more than 10,000 specialised English–Vietnamese terms. Each entry is structured to include:
(i) part of speech;
(ii) International Phonetic Alphabet (IPA) transcription;
(iii) standard English pronunciation (British and/or American accent);
(iv) concise English definition;
(v) Vietnamese equivalent and explanation; and
(vi) illustrative images where applicable to enhance conceptual understanding.
(vii) related technical terms to facilitate conceptual linkage and vocabulary expansion within the same thematic domain.

This multimodal presentation is intended to support not only vocabulary recognition but also pronunciation accuracy, semantic comprehension, and long-term retention. The inclusion of visual illustrations is particularly beneficial for anatomical structures, pathological conditions, equipment, and production systems, which are often difficult to conceptualize through text alone.

2.1.3 Platform architecture and user interaction

The ASVM Dictionary is implemented as a digital platform accessible via both a dedicated website (https://asvmdict.com) and mobile applications compatible with major operating systems. The interface was designed to be user-friendly, intuitive, and responsive across devices, allowing learners to access terminology during lectures, self-study sessions, or professional activities. Registered users are able to create personal accounts, bookmark frequently used terms, and submit suggestions for new entries or revisions. Community contributions are subject to academic review by the development team to maintain scholarly accuracy. This semi-open model encourages continuous expansion of the lexical database while preserving quality control.

2.1.4 Educational orientation and digital learning support

Unlike conventional printed dictionaries, the ASVM Dictionary was developed with a clear pedagogical orientation toward ESP teaching and autonomous learning. Real-time search functionality enables rapid lookup of terminology during reading or classroom activities, while pronunciation support assists learners in developing oral communication skills in professional contexts. The digital format also allows continuous updates in response to scientific advances, addressing a major limitation of traditional reference materials. Overall, the development of the ASVM Digital Dictionary represents an integration of academic content expertise and digital technology, aimed at enhancing access to specialized English terminology and supporting modern, learner-centered approaches in Animal Science and Veterinary Medicine education.

3.0 Results

3.1. Usage statistics and user participation

Since its official launch on 15 April 2022, the ASVM Digital Dictionary has demonstrated substantial user engagement and adoption. Usage analytics recorded from April 2022 to November 2025 indicate a total of 85,412 website visits and 2,153 mobile application downloads, reflecting a sustained and growing interest in the platform. In addition, 234 registered user accounts actively contributed content suggestions, term revisions, or feedback, highlighting the interactive and community-oriented nature of the system.

The primary user groups include undergraduate and postgraduate students majoring in Animal Science and Veterinary Medicine, university lecturers, practicing veterinarians, and professionals working in livestock feed, animal health, and pharmaceutical companies. This diverse user profile suggests that the ASVM Dictionary is not limited to academic use but also supports professional practice and lifelong learning within the animal-related disciplines.

3.2. Perceived educational benefits

Informal feedback collected during internal implementation at Can Tho University, Vietnam, indicates that the ASVM Dictionary positively influenced students' ability to comprehend and apply specialised English terminology. Users frequently highlighted the advantages of standardised pronunciation, International Phonetic Alphabet (IPA) transcription, and illustrative images, which were reported to facilitate vocabulary retention and contextual understanding, particularly for complex anatomical, physiological, and pathological terms. Students also reported that the availability of the dictionary on both mobile devices and desktop computers enabled seamless integration into daily learning activities, such as lectures, group discussions, assignments, and independent reading of English-language academic materials. This flexibility supports self-directed learning, a key competency emphasised in modern higher education frameworks.

3.3. Digital engagement and learning support

The real-time search functionality of the ASVM Dictionary allows rapid lookup of terminology during reading or classroom activities, reducing cognitive load and minimizing interruptions to learning processes. Unlike printed dictionaries, the digital format supports continuous updating and expansion of content, ensuring that newly emerging terminology in animal science, veterinary medicine, and related technologies can be incorporated in a timely manner. The interactive design of the platform, including user bookmarking and contribution features, encourages repeated use and active engagement. These characteristics align with learner-centered and technology-enhanced pedagogical approaches, which emphasize autonomy, interaction, and contextualised learning. Overall, the usage data and user feedback suggest that the ASVM Digital Dictionary functions not only as a reference tool, but also as a digital learning support system that enhances ESP learning outcomes and promotes sustained engagement among students and professionals in Animal Science and Veterinary Medicine. An overview of the implementation of English for Specific Purposes (ESP) courses in Animal Science and Veterinary Medicine programs in Vietnam is summarised in Table 1.

Table 1. Overview of ESP implementation in Animal Science and Veterinary Medicine programs in Vietnam

Indicator	**Summary description**
Number of universities surveyed	18
Presence of ESP courses	Common across undergraduate curricula
Credit allocation	Typically, 2–3 credits
Main instructional focus	Reading comprehension and technical vocabulary
Identified limitations	Lack of specialized bilingual digital tools
Implication for learning	Difficulty in accessing international literature

A comparison between the ASVM Digital Dictionary and conventional reference resources is presented in Table 2.

Table 2. Comparative analysis of ASVM Digital Dictionary and conventional reference resources

Feature	Printed bilingual dictionaries	Monolingual English dictionaries	ASVM Digital Dictionary
Language support	EN–VI	English only	EN–VI
Update frequency	Low (static)	Moderate	High (dynamic)
Pronunciation support	No	Limited	IPA + audio
Visual illustrations	Rare	Limited	Integrated
Digital accessibility	No	Partial	Web + mobile
Curriculum integration	Low	Low	High

Feature	Printed bilingual dictionaries	Monolingual English dictionaries	ASVM Digital Dictionary
Learner autonomy support	Limited	Moderate	High

4.0 Discussion

4.1 Integration of the ASVM dictionary into ESP Curricula

The findings of this study indicate that the ASVM Digital Dictionary possesses strong potential for integration into English for Specific Purposes (ESP) courses within Animal Science and Veterinary Medicine programs in Vietnam. A review of undergraduate curricula across at least 18 higher education institutions reveals that ESP courses are widely implemented, albeit with considerable variation in course titles, credit allocation, and instructional approaches. Despite this widespread inclusion, many institutions continue to rely on general English textbooks or printed glossaries, with limited access to specialised and digitised learning resources.

The ASVM Dictionary addresses this gap by providing a discipline-specific, bilingual, and digitally accessible reference tool that aligns closely with the learning objectives of ESP courses. Its real-time search functionality and mobile accessibility enable seamless use during lectures, laboratory sessions, and independent study, thereby supporting both instructor-led and student-centered learning environments. Such integration is particularly relevant in competency-based education models, where students are expected to actively engage with authentic academic materials in English.

4.2. Pedagogical advantages over traditional reference materials

Compared with conventional printed dictionaries and static glossaries, the ASVM Dictionary offers several pedagogical advantages. First, its multimodal design, incorporating pronunciation audio, IPA transcription, and illustrative images, enhances comprehension and retention of specialized terminology. This is especially beneficial for complex anatomical structures, disease conditions, and production systems that are difficult to conceptualize through text alone (Boden and Andrews, 2017; Taibo, 2019). Secondly, the digital format allows continuous updating, addressing a major limitation of printed resources that often become outdated as scientific knowledge evolves. In rapidly advancing fields such as animal biotechnology, nutrition, and veterinary diagnostics, the ability to incorporate new terminology in a timely manner is essential. Thirdly, the semi-open contribution model encourages academic interaction while maintaining quality control through expert review, fostering a collaborative learning ecosystem rather than passive vocabulary acquisition.

4.3. Alignment with digital and learner-centered education

The ASVM Dictionary aligns well with contemporary trends in higher education that emphasize digital transformation, learner autonomy, and blended learning. Students' reported use of the dictionary during lectures, group work, and independent reading suggests that the platform supports flexible learning pathways and reduces dependence on instructors for immediate clarification of terminology. This autonomy is particularly important in ESP contexts, where students must develop confidence in navigating English-language academic texts independently. Moreover, the dictionary's compatibility with digital learning management systems (LMS), such as Moodle, creates opportunities for deeper curricular integration. For example, instructors may embed direct links to ASVM entries within lecture materials, assignments, or online quizzes, thereby contextualizing vocabulary learning within disciplinary content. Similar approaches have been shown to improve vocabulary acquisition and reading comprehension in ESP settings (Nguyen et al., 2023).

4.4. Implications for ESP teaching in Animal Science and Veterinary Medicine

From a pedagogical perspective, the ASVM Dictionary supports a shift from rote memorisation of terminology toward contextualised and functional language use. By enabling quick access to accurate definitions and pronunciation, the platform allows learners to focus on higher-order cognitive tasks such as interpreting research findings, discussing case studies, and synthesising information from multiple sources. This shift is consistent with outcome-based education frameworks that prioritise practical language competence over isolated vocabulary knowledge. Overall, the integration of the ASVM Digital Dictionary into ESP curricula has the potential to enhance teaching effectiveness, improve student learning outcomes, and strengthen the linkage between language instruction and disciplinary knowledge in Animal Science and Veterinary Medicine education in Vietnam.

4.5. Comparative analysis with existing reference materials

The comparative results shown in Table 2 highlight several distinctive advantages of the ASVM Digital Dictionary over conventional reference resources. A comparison between the ASVM digital dictionary and commonly used reference materials in Animal Science and Veterinary Medicine highlights several distinctive advantages of the ASVM platform. Although traditional resources, such as printed bilingual glossaries and discipline-specific textbooks (e.g., Oe & Vo, 1997, 1998; Cao et al., 2013) have played an important role in ESP teaching in Vietnam, these materials are however,

inherently limited by their static format, restricted update cycles, and lack of multimedia support. In contrast, the ASVM dictionary provides instant digital access, multimedia-enhanced entries, and real-time search functionality, allowing users to retrieve terminology efficiently during authentic learning tasks. Compared with monolingual English dictionaries, such as Black's Student Veterinary Dictionary (Boden & Andrews, 2017), the ASVM dictionary offers the additional benefit of Vietnamese equivalents and explanations, which is particularly valuable for learners at intermediate proficiency levels. This bilingual approach reduces misinterpretation of technical terms and supports more accurate comprehension of complex scientific concepts. Furthermore, the ASVM dictionary differs from conventional reference materials by enabling community-based content expansion under expert supervision. This feature allows the dictionary to evolve alongside advances in animal science and veterinary medicine, while maintaining academic rigour. Such adaptability is rarely achievable with printed resources, which often become outdated shortly after publication.

4.6. Current challenges and system limitations

Despite its demonstrated educational value, the ASVM digital dictionary currently faces several limitations that warrant consideration. First, the platform does not yet incorporate integrated learning exercises, such as vocabulary quizzes, matching tasks, or context-based practice activities. Consequently, while ASVM effectively supports terminology lookup and comprehension, it provides limited direct scaffolding for active skill reinforcement. Secondly, advanced search functions and intelligent term recommendations remain relatively basic. The current system does not yet employ artificial intelligence (AI) or machine learning algorithms to personalise learning pathways, suggest related terminology, or adapt content to individual user proficiency levels. As a result, the learning experience, although flexible, is not fully optimised for personalization. Thirdly, the community contribution mechanism is still in an early stage of implementation. Although expert moderation is applied, further refinement of review criteria and clearer editorial roles are required to ensure long-term consistency, academic accuracy, and scalability as the user base expands.

4.7. Future development directions

Future development of the ASVM digital dictionary will focus on enhancing both its technological capacity and pedagogical effectiveness. One priority direction is the integration of artificial intelligence, enabling personalised vocabulary recommendations, improved search accuracy, and adaptive learning trajectories tailored to individual users' academic or professional needs. In addition, the development of interactive learning modules, including quizzes, thematic vocabulary exercises, and short instructional videos, is expected to strengthen active learning and reinforce long-term retention of terminology. Offline access or downloadable content is also planned to support learners in areas with limited internet connectivity. From an institutional perspective, establishing formal collaborations with universities to adopt ASVM as a standard learning resource within ESP courses would enhance its sustainability and educational impact. Beyond Animal Science and Veterinary Medicine, the ASVM framework may be expanded to related disciplines such as Agriculture, Aquaculture, Food Technology, and Environmental Science, contributing to a broader interdisciplinary digital learning ecosystem.

5.0 Conclusion

The ASVM digital dictionary represents an innovative digital learning resource developed in response to practical challenges in teaching and learning English for Specific Purposes in Animal Science and Veterinary Medicine in Vietnam. By integrating bilingual terminology, standardised pronunciation, visual illustrations, and real-time search functionality, the platform addresses critical gaps associated with traditional reference materials. Usage data and user feedback indicate that ASVM effectively supports terminology acquisition, learner autonomy, and digital engagement among students and professionals. Its potential for curricular integration, combined with planned technological enhancements, positions the ASVM Dictionary as a sustainable and scalable solution for ESP education in animal-related disciplines. Overall, the ASVM initiative demonstrates how the integration of academic expertise and digital technology can contribute meaningfully to higher education quality and international academic integration.

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