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CENG 407 - Literature Review

VR-Anatomy: VR Based Educational Interactive Human Anatomy Training Platform

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1. Abstract

This report presents a literature review conducted for the design of a virtual reality-based learning environment focused on human anatomy and body systems. The main objective of the project is to support introductory anatomy education by providing an accessible, immersive, and interactive 3D experience that complements traditional teaching methods such as plastic models and 2D atlases, helping students recognize and understand basic human anatomy and body systems. To position the proposed system within existing work, we reviewed studies at the intersection of VR, anatomy, and medical education, as well as selected commercial applications that offer 3D anatomical content. The literature includes academic studies that compare VR or 3D systems with traditional teaching methods, generally evaluating learning outcomes, user satisfaction, and perceived usefulness. Overall, the findings suggest that VR can improve motivation, interest, and spatial understanding of anatomical structures. Based on observations, our project aims to develop a VR-based human anatomy and body systems learning application that combines interactive exploration with detailed 3D models and integrated testing.

2. Introduction

Human anatomy is a fundamental topic in health-related education and an essential for understanding how the human body functions. However, for many introductory-level learners, such as vocational high school students in health or related programs, anatomy is often perceived as abstract and difficult to visualize. Traditional teaching materials, including 2D atlases, posters and simple plastic models, can be sufficient for memorizing the names of structures but may not fully support the development of three-dimensional spatial understanding. Differences in learning styles, limited prior knowledge and restricted access to high-quality physical models can make it even harder for some students to build a solid conceptual understanding of basic anatomical structures and body systems. As a result, students may struggle to connect what they see in books with how organs and systems are actually organized in the human body. Recent advances in educational technology, and particularly in virtual reality, offer new opportunities to address these challenges.

VR can provide an immersive, interactive 3D environment in which learners can explore anatomical structures from multiple angles, zoom in on specific regions and engage with content in a more active and engaging way. Many existing VR anatomy platforms, however, are designed primarily for university-level medical students, and can be too complex, dense or language-heavy for younger learners. In addition, they may lack guided activities and explanations tailored to the needs and curriculum of vocational high school students, making them difficult to integrate directly into basic anatomy courses. This situation creates a need for a VR-based learning tool that is specifically designed for introductory anatomy education, with clear, accessible content and structured learning activities aligned with basic curriculum goals.

The project presented in this report aims to design a VR-based learning environment that supports introductory human anatomy and body systems education. The focus is on helping students recognize and understand basic anatomical structures through an accessible, immersive and interactive 3D experience that complements traditional teaching methods like plastic models and 2D atlases. Within the VR environment, learners will be able to explore 3D models of key anatomical structures, observe their relative positions and relationships and interact with them through actions such as rotating, zooming, highlighting and viewing basic descriptions. Integrated quizzes are planned to reinforce learning, turning the application into an active learning tool rather than a purely visual reference. In this way, the system is intended to make introductory anatomy more concrete, engaging and memorable for vocational high school students.

3. Background and Core Topics Related to the Project

3.1. Anatomy Education and Challenges in Introductory Learning

Anatomy is one of the core components of health-related education and provides the structural basis for understanding how the human body functions. In introductory courses, students are typically introduced to the major body systems rather than very detailed regional anatomy. Each system is presented as a set of organs and structures that work together to perform specific functions, such as movement, breathing, circulation or digestion. For learners at the vocational high school level, the goal is practical understanding of how the body is organized, so that they can interpret basic health information, understand simple clinical situations and communicate effectively in health-related environments.

Traditional anatomy education in this context often relies on textbooks, 2D atlases, posters and, when available, simple plastic models. These materials usually present each body system separately, outlining its main organs, basic structure and key functions. While this approach can be effective for listing and memorizing anatomical terms, it can make it difficult for students to develop an integrated mental picture of how the different systems are arranged in three-dimensional space and how they relate to one another. For example, a student might know the names of the major bones or organs, but still struggle to visualize where they are located relative to each other in the body, what their approximate size is or how they fit within the overall structure of the torso, head or limbs.

In addition to these representational limitations, introductory anatomy learning is also affected by factors such as limited lesson time and varying levels of motivation among vocational high school students. Some learners may quickly memorize names without fully understanding what they represent, while others may feel overwhelmed by the volume of unfamiliar terms and diagrams. When anatomical structures are taught largely as lists to be remembered rather than as meaningful parts of a coherent whole, students can have difficulty retaining what they learn or applying it in new situations. Altogether, these challenges make it harder for beginners to develop an intuitive, three-dimensional understanding of the body, even when they appear to know individual anatomical terms [1].

3.2. Virtual Reality in Education and VR-Based Anatomy Learning

Virtual reality has emerged as a promising technology in education because it can create immersive, three-dimensional environments that go beyond the limitations of traditional classroom materials. In a VR setting, learners are visually and sometimes physically “placed” inside a virtual world, where they can look around freely, interact with objects and experience situations that would be difficult, expensive or impossible to reproduce in real life. This sense of immersion can increase attention and curiosity, especially for students who are used to digital media and games. Instead of only reading about a topic or viewing static pictures, learners can actively explore content, which can make abstract or complex concepts more concrete and memorable [2].

From a pedagogical perspective, VR supports active and experiential learning approaches. When students are able to manipulate virtual objects, perform simple tasks and see the immediate consequences of their actions, they are not just receiving information but also constructing their own understanding. This can be particularly valuable in subjects that involve spatial relationships or procedural steps, such as navigating a virtual environment, assembling components or visualizing 3D structures. VR also allows educators to design safe and controlled scenarios. In addition, VR experiences can be repeated and paused as needed, giving students the opportunity to revisit challenging concepts at their own pace [3].

In the context of health and anatomy education, VR offers specific advantages that align well with the needs of introductory learners. Three-dimensional models of the human body and its systems can be explored from different perspectives, enlarged for closer inspection and selectively highlighted to focus attention on particular structures. For vocational high school students, this can bridge the gap between abstract textbook images and the actual organization of the body by providing a more intuitive sense of depth, position and scale. However, to be effective at this level, VR applications must balance immersion with simplicity: interfaces need to be clear and easy to use, content must be aligned with basic learning objectives and the overall experience should support rather than overwhelm beginners. When designed with these considerations in mind, VR can become a powerful complementary tool that enhances motivation, supports visual understanding and enriches the learning experience in introductory anatomy courses.

3.3. User Experience and Feedback in VR Anatomy Applications

In VR anatomy learning environments, interaction design and user experience play a central role in determining whether students can focus on the content or become distracted by the interface. For vocational high school learners, who may have limited experience with VR, controls need to be intuitive and consistent. Core actions such as rotating 3D models, zooming in and out, selecting structures and revealing labels or short descriptions should be easy to discover and perform without reading long instructions. Overly complex menus, dense interfaces or advanced options designed for experts can increase cognitive load and frustration. Clear visual cues, such as highlighting selected structures, using readable labels and providing straightforward icons or tooltips, help learners understand what they can do and what is currently happening in the virtual environment. A well-designed interaction model therefore supports students in engaging with anatomical content rather than struggling with technology [4].

Comfort and accessibility are equally important aspects of user experience in VR-based anatomy learning. Poorly designed camera motion, navigation or visual layouts can cause motion sickness, eye strain or fatigue, which is especially problematic for younger learners. To avoid these issues, navigation is often kept simple, for example by using teleportation or fixed viewpoints instead of continuous free movement, and by ensuring that camera transitions are smooth and predictable [5]. Text and anatomical labels should be sufficiently large and high-contrast to be easily readable, and interactive elements such as buttons or hotspots on the model must be sized and positioned so they can be reached comfortably with standard VR controllers. In addition, providing light guidance can keep learners oriented and help them progress through the activity step by step, instead of feeling lost in a complex virtual space [6].

Assessment and feedback mechanisms within the VR application complete this picture by turning exploration into a structured learning process. Rather than serving only as a visual reference tool, a VR anatomy system can integrate simple quizzes and tasks that ask learners to identify structures, match names to locations or recall basic functions of organs and systems. When students receive immediate feedback, they can monitor their own understanding and correct misconceptions in real time. Combining intuitive interaction, comfortable and accessible design, and built-in assessment and feedback therefore creates a cohesive VR learning experience that supports both engagement and meaningful understanding of anatomy [7].

3.4. Unity as a Game Engine for VR-Based Anatomy Applications

Unity is a widely used game engine and development environment that supports the creation of interactive 2D and 3D applications for multiple platforms, including virtual reality. It provides a scene-based workflow in which developers can place and configure 3D models, lights, cameras and user interface elements, and then attach scripts written in C# to define interactive behaviours. Unity's component-based architecture allows functionality to be built by combining reusable components on game objects rather than writing all logic from scratch [8]. This combination of visual editing tools, scripting capabilities and built-in VR support makes Unity a practical choice for educational VR applications, where developers often need to focus on designing meaningful content and interactions rather than on implementing low-level rendering or tracking systems.

For a VR anatomy learning application, Unity can be used to manage and present 3D anatomical models in a clear and controllable way. Different body systems or regions can be organized into separate scenes, while lighting and camera settings can be adjusted to highlight relevant structures. Typical interactions, such as rotating a model, zooming in and out, selecting a structure, highlighting it and displaying its name or a short description, can be implemented by attaching scripts to anatomical objects and using Unity's event system to respond to VR controller input. Unity's UI tools also make it possible to create simple, readable menus, buttons and information panels, which is particularly important for introductory learners who may be using VR for the first time [9]. In addition, the engine supports an iterative workflow in which developers can quickly test changes in play mode, reuse existing assets and benefit from extensive documentation, tutorials and community resources [10].

Unity can also serve as a bridge between the VR application and external AI-based services that support feedback and assessment. Through its C# scripting and networking capabilities, Unity can communicate with machine learning models or educational back-end systems that analyse quiz results, track common mistakes or generate simple hints for learners. Unity's ability to integrate third-party libraries and web APIs allows developers to experiment with features such as adaptive question selection, simple conversational guidance or automated progress summaries without embedding complex AI logic directly into the game engine. In this way, AI-enhanced functionality can be layered on top of the core Unity-based interaction and visualization, gradually enriching the learning experience while keeping the underlying architecture manageable [11].

3.5. AI-Supported Learning in VR Anatomy Applications

Artificial intelligence has increasingly been used in educational systems to provide more personalized and data-driven support for learners, without replacing the teacher. Rather than always relying on fully dynamic or self-learning systems, AI in educational applications can also be built on carefully designed, static data sets that are structured for teaching. This approach allows developers and educators to control the accuracy, scope and difficulty of the material while still benefiting from AI techniques to deliver, organize and present the content in a flexible way. At the same time, it makes it possible to monitor learning progress in more detail and to provide timely, targeted support to learners [12].

Feedback is a central area where AI can contribute to educational applications, both through automated responses and conversational support. In many traditional settings, students receive feedback only after an exam or assignment has been graded, which can delay the correction of misconceptions, whereas AI-supported systems can provide immediate feedback during or right after a learning activity. When a learner answers a quiz question, selects an option or interacts with a digital object, the system can automatically classify the response as correct or incorrect, highlight the relevant part of the material and display a short explanation or hint [12]. In addition to this automated feedback, AI can also support learning through interactive question–answer mechanisms and conversational assistance: a chatbot-style component, connected to the underlying anatomy content, can allow students to ask questions in natural language and receive concise, targeted answers. This conversational layer can be integrated into the VR experience or provided alongside it, and, depending on available resources, may be extended with speech technologies so that students can listen to explanations or even ask questions by speaking instead of typing. Such features are particularly helpful for introductory learners, as they reduce the barrier to seeking help and make the interaction feel more similar to asking a teacher for clarification [13].

In a VR-based anatomy learning environment, AI-supported feedback and assessment can complement the system's visual and interactive features by using a static educational knowledge base, a structured set of test questions and a chatbot-style interface. Even if the goal at the introductory level is not to build highly complex adaptive systems, integrating AI-driven feedback and simple forms of adaptation can make the learning experience more responsive to individual needs: fixed data ensure that explanations and questions remain aligned with the curriculum and at an appropriate level for vocational high school students, while AI components help deliver this content in a more interactive way. By combining VR-based visualization with AI-supported assessment, such applications can offer both engaging exploration and structured guidance. In this setting, AI does not replace traditional teaching but reinforces it through instant answers, basic feedback and additional practice opportunities that are closely linked to the anatomical concepts presented in the virtual environment [14].

4. Related Work and Existing Applications

In this section, we focus more concretely on existing systems and studies that have applied our project's topic in practice. Our aim is to understand how VR-based anatomy applications have been designed, what kinds of learners they target, which interaction and feedback mechanisms they use and what kinds of learning outcomes have been reported. This overview helps us position our own project within the current landscape of VR anatomy tools rather than designing it in isolation.

The literature on VR in anatomy and health education is quite diverse. Some systems are designed as immersive 3D atlases that allow students to explore anatomical structures in detail, while others focus on specific regions such as the heart, skull or brain, or even on advanced surgical training scenarios. Many studies compare VR-based learning with traditional methods typically measuring knowledge gains, spatial understanding, motivation and user satisfaction. More recent work also explores how AI components, such as virtual assistants or adaptive assessment, can be integrated into VR environments to provide more personalized support.

For our purposes, we concentrate on a subset of studies and applications that are most relevant to an introductory-level, system-focused anatomy course. The following paragraphs summarize five representative examples in more detail and highlight how their design choices and findings inform the design of our own VR-based anatomy and body systems learning environment.

- In the study "An Alternative Method for Anatomy Training: Immersive Virtual Reality", examined whether an immersive 3D VR application could be used as an alternative to traditional anatomy education for undergraduate physical therapy students. In their randomized controlled study, 72 students were divided into a control group, which used traditional materials, and a VR group, which used an interactive 3D anatomy application. Both groups completed anatomy tests before and after the learning sessions. The results indicated that students in the VR group showed a greater improvement in test scores and reported positive impressions of the immersive environment, suggesting that VR can support understanding of anatomical structures rather than serving only as an eye-catching technology [15]. Although the study was conducted with university-level students, it provides useful evidence that interactive 3D visualization in VR can enhance anatomy learning. For our project, which targets introductory-level vocational high school students, this work supports the idea that a VR-based system with 3D anatomical models and structured quizzes can improve learners' motivation and help them build a more robust understanding of body structures compared to relying solely on traditional 2D materials.

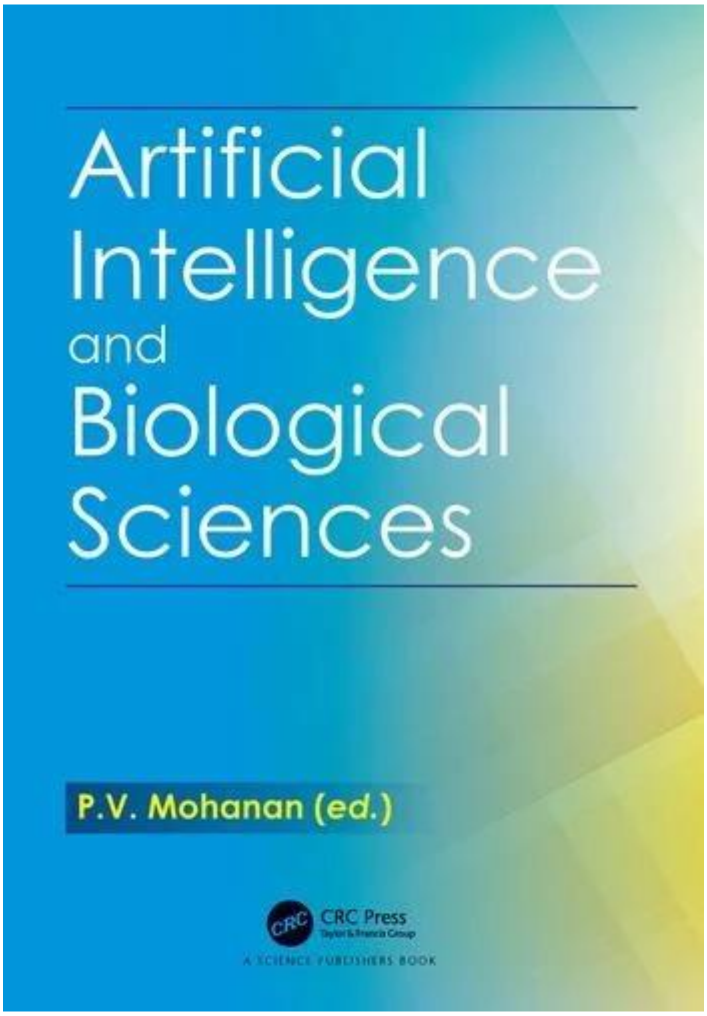
- In the article “Immersive Anatomy Atlas: Learning Factual Medical Knowledge in a Virtual Reality Environment”, the authors present an immersive VR-based anatomy atlas designed to help students learn factual anatomical information through three-dimensional exploration. Instead of studying only from textbooks or 2D images, learners use a VR headset to inspect anatomical structures from different angles, zoom in on specific regions and access basic labels and descriptions inside the virtual environment. In their evaluation, the immersive atlas was tested with high school students and compared with more traditional learning resources, and the authors examined outcomes such as factual test scores, learning time and students’ perceptions of the VR tool. The results suggest that the immersive atlas can support the acquisition of factual anatomical knowledge at least as effectively as conventional methods, while also increasing engagement and interest in the subject [16]. Because this study was conducted with learners at the high school level rather than only with university students, it is particularly relevant for our project. It shows that a relatively simple VR atlas with clear 3D models and basic information can function as a structured learning tool for younger learners, which supports our decision to design a VR-based application in which vocational high school students explore key body systems in three dimensions and reinforce their learning through integrated quizzes and short descriptions aligned with their introductory curriculum.

- In the article “Using Virtual Reality to Complement and Enhance Anatomy Education”, describe the development of a pilot VR anatomy resource that presents a set of 3D anatomical models in an immersive environment for university students. Instead of replacing existing teaching methods, the system is explicitly designed to complement traditional resources such as atlases and models by allowing learners to inspect structures in three dimensions and experience a stronger sense of being inside the anatomy. The authors report that students who used the VR resource generally found it engaging and helpful for understanding spatial relationships, and they viewed the technology as a valuable addition to their anatomy teaching rather than a novelty. At the same time, the study is a small-scale pilot conducted in a single institution, so the results mainly provide qualitative evidence about perceived usefulness and acceptance rather than large-scale learning gains [17]. For our project, this work is important because it supports the idea of positioning our VR application as a complementary tool alongside existing materials used in vocational high schools, helping students visualize body systems in 3D while still staying aligned with the more familiar 2D diagrams and models used in their regular lessons.

- In the conference paper “Towards Anatomy Education with Generative AI-based Virtual Assistants in Immersive Virtual Reality Environments”, the authors explore how a generative AI assistant can be embedded inside a VR anatomy environment to support learners during complex question-answer tasks. They design a virtual reality system in which students interact with an embodied AI tutor that can respond to different levels of anatomy questions through natural language dialogue, and they compare different assistant configurations, such as avatar-based versus screen-based presentation. In a small pilot study with medical students, they report that the AI-supported VR environment was generally usable, that students perceived a good sense of presence and that the assistant could help them handle cognitively demanding anatomy questions without overloading them [18]. Although this work targets a more advanced medical education context and uses state-of-the-art generative AI, it is conceptually relevant to our project. It illustrates how conversational AI can be integrated into a VR anatomy application to provide on-demand explanations and guidance. Our system aims to apply the same idea at an introductory level, using a simpler, curriculum-aligned knowledge base and basic chatbot interface to allow vocational high school students to ask questions about body systems and receive concise, supportive feedback while exploring the VR environment.

- In the article "Cognitive Load Measurement of Using Virtual Reality Headset (Oculus Rift CV1) to Enrich the Anatomy Course and Increase Motivation Among Medical Students", Alfarani and Alharbi examine how adding a VR headset–based anatomy application to a university anatomy course influences students' mental effort and motivation. Third-year medical students used an headset to complete several anatomy-related tasks and then rated how demanding and useful they found the experience, which was compared with their impressions of traditional teaching methods. The authors report that, although VR is a new medium, students did not experience an unacceptable increase in cognitive load and generally viewed the VR activities as engaging and motivating, suggesting that well-designed VR sessions can support learning without overwhelming learners. The study is limited to medical students and a specific institutional context, but it underlines the importance of designing VR tasks that are short, focused and clearly structured [19]. For our project, this work reinforces the idea that an introductory VR application for vocational high school students should use simple interactions, clear instructions and modest amounts of content per session, so that the motivational benefits of immersion are preserved while cognitive load remains manageable.

In addition to these core studies, several other works provide useful background on VR-based anatomy tools and delivery options. "Virtual Reality in Anatomy: A Pilot Study Evaluating Different Delivery Modalities" compares different ways of presenting VR content such as desktop, stereoscopic display and head-mounted display and shows that the choice of modality can influence students' comfort, engagement and perceived usefulness, which is relevant for deciding how immersive our own system should be [20]. Earlier systems such as the "Virtual Reality Educational Tool for Human Anatomy" and the "Virtual Reality Medical Training System for Anatomy Education" demonstrate how 3D anatomical models and basic interactions like rotation, zooming and selection can be implemented in VR for specific regions such as the cranium or the heart, indicating that even relatively simple applications can support anatomy learning [21] [22]. Finally, the book chapter "Learning Anatomy Using Virtual Dissections: Previous Experience and Future Directions Integrating Artificial Intelligence and Multiple Approaches" reviews the use of virtual dissection tools alongside textbooks and physical models, and discusses how AI could help adapt these tools to different learner needs [23]. Together, these studies illustrate a progression from early VR anatomy prototypes to more structured and AI-aware systems, and they support our decision to design a focused, system-level VR application that combines clear 3D visualization with simple interaction and curriculum-aligned assessment for vocational high school students.



5. Discussion and Identified Gaps

The studies and applications reviewed in the previous section suggest that virtual reality has clear potential to support anatomy education with the positive findings such as visualization, spatial understanding and learner motivation. Although, despite these positive findings, several gaps emerge when the existing literature is considered from the perspective of our target context. First, most VR anatomy systems are designed for medical or university-level students and assume a relatively high degree of prior knowledge and familiarity with scientific terminology. There is much less work focusing on introductory-level learners, such as vocational high school students, who need simplified, system-level content rather than detailed regional or surgical anatomy. Second, many applications either present highly detailed whole-body models or focus on advanced, specialized topics, which makes them difficult to adapt to a basic curriculum that aims primarily to introduce major body systems and key structures. Third, although some studies integrate quizzes or evaluation components, a considerable number of VR tools are used mainly for free exploration and do not include simple, curriculum-aligned assessment and feedback mechanisms that could help beginners check their understanding while they explore.

A further set of gaps concerns user experience and the integration of AI-based support. Several works acknowledge issues such as motion sickness, interface complexity and the need to manage cognitive load, but relatively few explicitly address the design of VR interactions for learners who may be encountering both the content and the technology for the first time. Simple controls, clear labels and short, focused activities are particularly important at this level, yet many existing systems are not tailored with these constraints in mind. In parallel, only a small number of recent studies investigate how conversational AI or virtual assistants can support anatomy learning inside VR environments, and these are typically aimed at advanced medical students and complex question types. There is still limited evidence on AI-supported VR tools that rely on a static, curriculum-aligned knowledge base, provide basic question–answer interactions and offer immediate but simple feedback suitable for beginners. Overall, these observations indicate a need for a VR-based anatomy application that is explicitly designed for introductory, system-level content, combines guided 3D exploration with integrated quizzes and lightweight AI support, and is optimized for the usability and cognitive demands of vocational high school learners.

6. Proposed System and Expected Contributions

Our proposed system is a VR-based learning application that aims to support introductory human anatomy and body systems education for vocational high school students. The main idea is to provide an accessible 3D environment where learners will be able to explore key anatomical structures in an immersive but controlled way, instead of relying only on 2D textbook images and static posters. Using a Unity-based implementation, the system is planned to present simplified 3D models of selected body systems with a level of detail appropriate for an entry-level curriculum. Students will be able to inspect these models from different viewpoints, zoom in on specific regions and highlight individual structures, while seeing short, curriculum-aligned labels and descriptions that focus on names, locations and basic functions rather than on advanced clinical detail.

The interaction design is intended to remain simple to match the needs of learners who may have little or no prior experience with VR. Core actions such as rotating a model, zooming, selecting a structure and toggling labels will be mapped to a small, consistent set of controller inputs and visually reinforced through clear on-screen hints. Navigation is planned to be organized around a limited number of scenes or “modules”, each corresponding to a specific body system or region, so that students do not get lost in a large, complex virtual space. Text elements will be high-contrast and readable, and the duration of individual VR activities will be kept short and focused to help manage cognitive load. In this way, the system is designed to complement, rather than replace, existing teaching materials. Students are expected to encounter a topic in class or in a textbook and then use the VR environment as an additional step to build a three-dimensional mental model of what they have learned.

To move beyond pure visualization, the application is also planned to integrate basic assessment and AI-supported assistance. Within each module, learners will be able to complete simple quiz activities that ask them to identify structures on the 3D model, match names to locations or recall basic functions. The questions and correct answers will be stored in a static, curated question bank aligned with the vocational high school curriculum, which will allow the system to provide immediate feedback, such as indicating the correct region on the model and displaying a short explanation. In addition, a chatbot-style interface is envisioned to give students an opportunity to ask questions in natural language about the structures they are viewing and to receive short, targeted answers based on the same underlying knowledge base. This conversational component may initially be text-based, with the option of adding speech output at a later stage so that explanations can also be listened to rather than only read.

The expected contributions of this project are therefore prospective. Practically, the planned system aims to provide a VR anatomy tool that is explicitly tailored to vocational high school learners, combining simplified 3D models, guided exploration and integrated quizzes in a single environment. Conceptually, the project seeks to bring together ideas from the literature on VR anatomy education, cognitive load and AI-supported feedback by applying them to an introductory, system-level setting that is underrepresented in existing work. The design choices we outline such as limiting complexity, structuring content around body systems and embedding a lightweight, curriculum-aligned chatbot are intended to serve as a small set of design guidelines for similar applications targeting beginner-level learners. Overall, the proposed system is expected to demonstrate that a carefully scoped VR and AI-supported application can make basic anatomy more concrete, engaging and understandable for vocational high school students without overwhelming them with unnecessary detail or technological complexity.

7. Conclusion

In this report, we explored how virtual reality and AI-supported tools could be used to support introductory anatomy and body systems education for vocational high school students. We first discussed the difficulties of learning anatomy at this level, where students need a basic understanding of major body systems but often struggle to visualize structures using only 2D resources. We then reviewed core concepts related to VR, user experience and AI-based feedback, and examined existing VR anatomy systems and studies. The literature suggests that immersive 3D environments can enhance motivation and spatial understanding, but also reveals gaps. Most systems target university or medical students, many focus on advanced or highly detailed content and relatively few combine simplified models, curriculum-aligned assessment and lightweight AI support for beginners.

In response to these gaps, we proposed a VR-based learning application tailored to vocational high school learners, built around simplified 3D models of selected body systems, guided exploration, integrated quizzes and a chatbot-style assistant backed by a static, curriculum-aligned knowledge base. The project is currently at a design stage, and the next steps will involve implementing the planned system, refining the interaction design and evaluating it with actual students in terms of usability, motivation and learning outcomes. Our overall goal is to show that a carefully scoped combination of VR visualization and AI-supported feedback can complement existing teaching methods and help introductory-level learners build a more concrete and intuitive understanding of basic human anatomy.

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