



Contemporary Issues in Healthcare Education

Solution: Lecturio, an innovative online learning platform for healthcare education.





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Executive Summary

Accessible and effective education plays a vital role in empowering individuals and advancing societies. However, traditional education systems face numerous challenges that hinder learners from reaching their full potential. This whitepaper explores these challenges and presents a solution:

Lecturio, an innovative online learning platform for healthcare education.

Traditional medical and nursing education often struggles with issues of accessibility and flexibility. Geographical limitations, financial constraints, and time commitments can restrict learners from accessing quality education. Furthermore, traditional lecture-based teaching methods have been questioned due to their limitations in effectively engaging learners and promoting deep understanding.

Additionally, the declining pass rates in the United States Medical Licensing Examination (USMLE®) and the National Council Licensure Examination (NCLEX®) raise concerns about the readiness of healthcare professionals. Furthermore, the global shortage of healthcare providers compounds the urgency to equip aspiring pro-

fessionals with the necessary knowledge and skills to bridge the gaps in healthcare services worldwide.

Lecturio offers a transformative approach to education designed to overcome these challenges. By leveraging the power of online learning, Lecturio provides a comprehensive and flexible platform that enhances accessibility, engagement, and personalized learning. This whitepaper delves into how Lecturio's features and methodologies effectively alleviate the problems faced in traditional education. To that end, relevant literature and research studies are highlighted to demonstrate how these features are supported by the evidence for the effectiveness of online learning platforms such as Lecturio.

To embark on this exploration of Lecturio's impact, it is essential to recognize the potential of innovative education platforms for reshaping the learning landscape. By embracing technology and adaptive methodologies, Lecturio offers a compelling solution to overcome the limitations of traditional education and prepare learners for success in the modern world.



Access to Quality Education

Traditional education often struggles to provide accessible and inclusive learning opportunities to individuals. Learners may be restricted by time constraints, financial concerns, or geographical distance from accessing quality education. This lack of accessibility can perpetuate educational inequalities and hinder the personal and professional growth of many individuals.

According to a report by UNESCO, approximately 258 million children and youth worldwide were out of school in 2018. Factors such as poverty, remote locations, and cultural barriers contribute to this significant education gap.⁽¹⁾ Moreover, the COVID-19 pandemic exacerbated the challenges by disrupting traditional education systems and widening the divide even further.

This problem extends to medical and healthcare education as well and poses a significant challenge. In many parts of the world, aspiring healthcare professionals and students face limited access to up-to-date, comprehensive, and relevant learning materials.⁽²⁾ This problem can arise due to various factors, including financial constraints, geographical barriers, and inadequate infrastructure.⁽³⁾ Without access to quality

education resources, individuals interested in pursuing medical and healthcare professions are deprived of the necessary knowledge and skills required to excel in their fields. The consequences of this issue are far-reaching, affecting the quality of healthcare delivery, exacerbating healthcare disparities, and impeding progress in medical research and innovation.⁽²⁾ Addressing this problem requires concerted efforts from governments, educational institutions, and organizations to develop and implement strategies that enhance accessibility to quality education resources, including online platforms, open educational resources, and partnerships that facilitate knowledge sharing and collaboration across borders.

Lecturio addresses the accessibility gap in medical and healthcare education by offering a wide range of online learning resources. Through the Lecturio platform, learners interested in healthcare careers can access high-quality educational materials, specialized courses, and comprehensive exam preparation resources. By breaking down geographical barriers and providing flexible learning options, Lecturio empowers aspiring healthcare professionals to pursue

their education and acquire the knowledge and skills necessary to excel in their chosen field. This accessibility fosters a more diverse and qualified healthcare workforce, ultimately enhancing the overall quality of healthcare services and improving health outcomes for individuals and communities.

Research studies have shown the positive impact of online learning platforms in increasing accessibility and continuity of education. Particularly in the time of COVID-19, when higher education faced an unprecedented disruption, online learning ensured the continuity of education and accessibility of learning for students. These disruptions resulted in sudden, seismic paradigm shifts in medical education that had been expected to take years, and were the catalyst for solidifying online learning into a permanent feature of the healthcare education field.⁽⁴⁾

In resource-scarce countries, Lecturio has allowed for learning to continue through disruptions such as the COVID-19 pandemic as well as power and internet outages, allowing for high-quality learning and instruction to take place in low-resource settings.⁽⁵⁾

For example, an open-access emergency medical course with materials provided by Lecturio was used by learners across the globe and was most accessed by learners in Syria, demonstrating the ability of online learning to reach those who may not have access to traditional medical education due to economic or political factors.⁽⁶⁾

In Afghanistan, Lecturio's online platform provides access to scientific and medical courses to learners who would otherwise have no way to continue their education. Lecturio's commitment to advancing medical education extends to those in resource-scarce countries, war zones, and restrictive environments who would otherwise not have access to education.

By overcoming the accessibility challenges faced by traditional education, be it due to temporary disruptions or more permanent constraints, Lecturio empowers learners to unlock their full potential and acquire knowledge and skills that can positively impact their lives and communities.



Teaching Methods

Traditional teaching methods, often centered around passive lecture-based instruction, have shown limitations in engaging learners and promoting deep understanding.⁽⁷⁾ The passive nature of lectures can hinder active participation, critical thinking, and information retention. Research studies have highlighted the need for more interactive and engaging learning experiences to enhance knowledge acquisition and retention.^(8,9) Unfortunately, many institutions still rely on old-fashioned or traditional teaching methods, such as lectures.

Traditional lectures often rely on one-way information delivery, limiting learner engagement and interactivity. The passive role of learners can lead to reduced motivation, attention, and comprehension of the subject matter.⁽¹⁰⁾ Further-

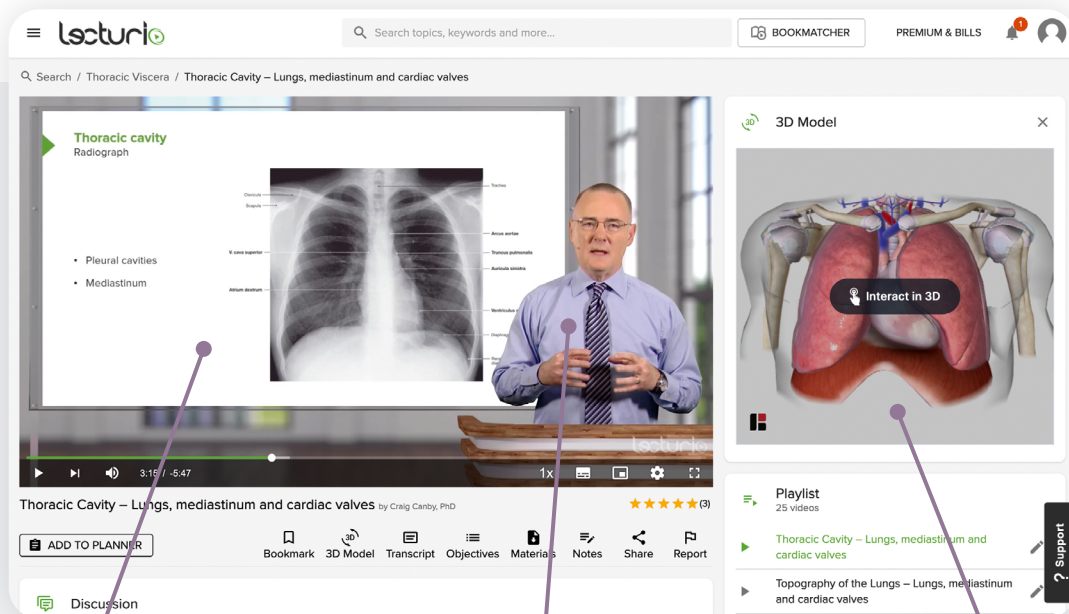
more, the “one-size-fits-all” approach of lectures may not cater to diverse learning differences and the individual needs of learners.

Research in medical education has emphasized the importance of interactive and engaging learning experiences to enhance knowledge acquisition and retention. One study conducted by Alaagib et al. (2019) compared the effectiveness of traditional lectures with interactive learning methods in medical education.⁽¹¹⁾ The researchers found that interactive methods led to better knowledge retention, improved critical thinking skills, and higher levels of learner satisfaction compared to traditional lectures, a finding echoed by other researchers.^(12,13)

Interactive and engaging learning with Lecturio

Lecturio offers an interactive and engaging learning experience through its innovative course materials and features. The platform uses multimedia elements such as high-quality videos, interactive quizzes, and gamified learning modules to create an immersive and dynamic learning environment. By incorporating interactive components, Lecturio promotes active participation, critical thinking, and deeper understanding of the subject matter. Moreover, all of these multimedia elements are deliberately designed with attention to detail to ensure alignment with multimedia learning principles.⁽¹⁴⁾

Lecturio's video lectures are designed to be visually appealing, concise, and conceptually rich, capturing learners' attention and facilitating information retention. Additionally, interactive quizzes and knowledge checks throughout the courses enable learners to actively test their understanding and reinforce their learning. This built-in formative assessment feature makes use of the testing effect and the strategy of spaced retrieval, both of which are supported by evidence from decades of research.⁽¹⁵⁾ These interactive elements not only enhance learner engagement but also provide immediate feedback, allowing learners to identify and address knowledge gaps effectively.



Illustrative slide deck

On-screen educator

3D anatomic model

Figure 1: Lecturio video Lecture and multimedia features

Feedback plays a crucial role in medical education as it provides learners with valuable information about their performance, identifies areas for improvement, and promotes self-reflection and growth. Explanatory feedback, such as that provided on the platform, is highly effective in supporting learners' understanding and skill development. Unlike simple evaluative feedback that only provides a judgment of performance, the explanatory feedback on the Lecturio platform provides additional information that explains why a certain response or action was correct or incorrect. This type of

feedback offers learners insights into the underlying reasoning and thought processes, helping them to develop a deeper understanding of the subject matter. By providing context and rationale, explanatory feedback enables learners to bridge the gap between theory and practice, make connections between concepts, and apply knowledge more effectively in clinical settings. It empowers learners to learn from their mistakes, correct misconceptions, and refine their clinical reasoning abilities, ultimately improving their overall competence as future healthcare professionals.

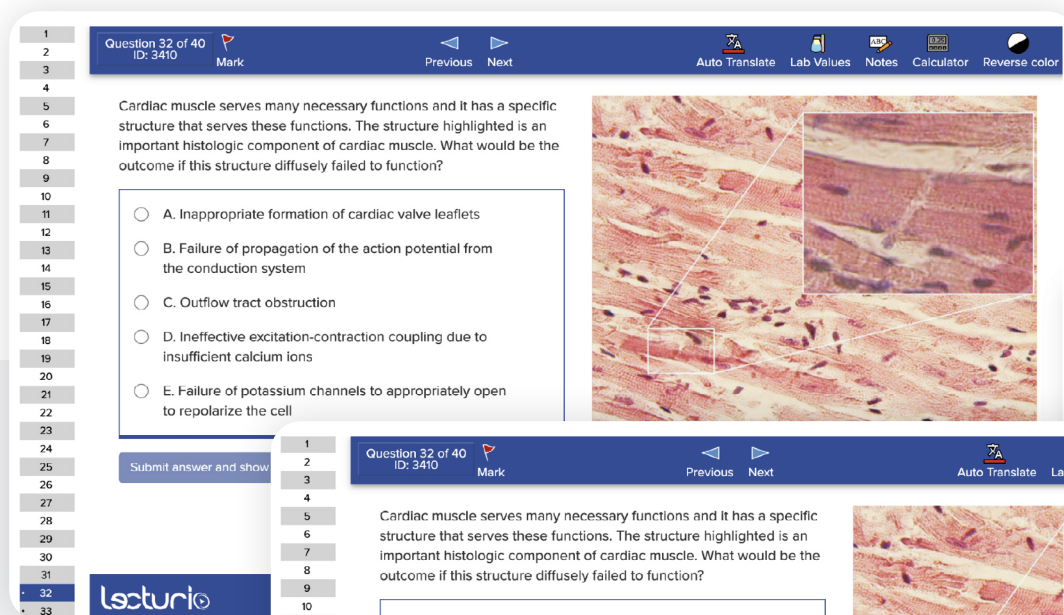


Figure 2:
Lecturio question
bank layout, modeled
after the USMLE® test
layout.

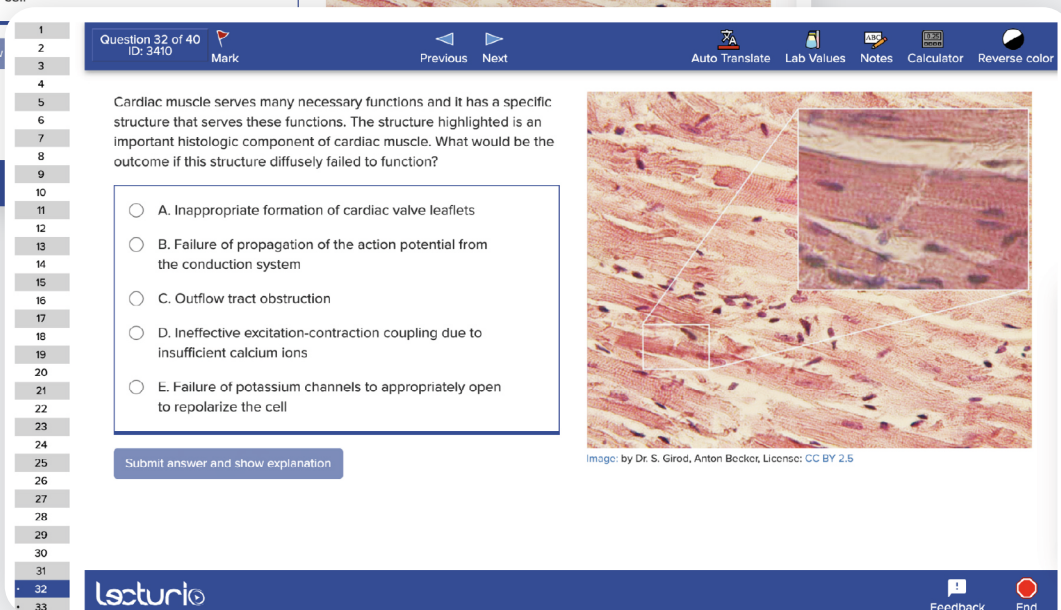


Figure 3: Lecturio question bank tutor mode feature, offering direct feedback for students' performance in the qbank practice tests done within the Lecturio platform

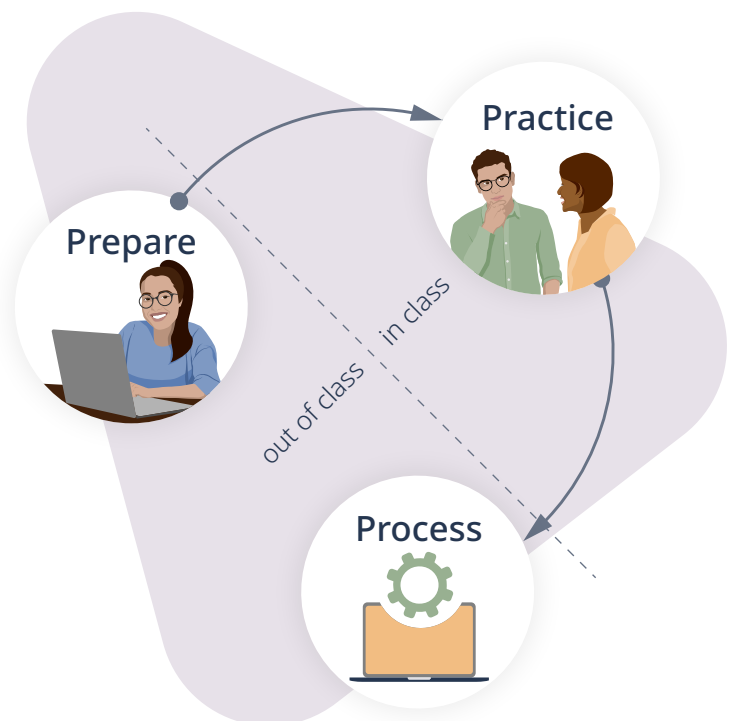
Implementing effective teaching methods

Lecturio offers a range of tools and resources that can support the implementation of effective teaching methods. Common applications are the **flipped classroom**, problem-based learning (PBL), and team-based learning (TBL) approaches.

Flipped Classroom

The flipped classroom model emphasizes the shift of traditional lecturing to independent learning outside the classroom, with in-class time dedicated to collaborative activities and discussions. A comprehensive analysis of 28 comparative studies employing a between-subject design demonstrated a notable positive impact of flipped classrooms in health professions education. The results indicated a significant advantage in favor of flipped classrooms over traditional classrooms, with a standardized mean difference (SMD) of 0.33 ($p < 0.001$). The majority of respondents expressed a preference for flipped classrooms compared to traditional ones.⁽¹⁶⁾

Lecturio's extensive library of interactive video lectures and educational content makes it an ideal resource for implementing the flipped classroom approach. Educators can assign pre-recorded lectures and study materials for students to access prior to the class, allowing them to grasp foundational concepts at their



own pace. This approach frees up valuable in-class time for active learning activities such as group discussions, problem-solving exercises, and hands-on experiments. Lecturio's video lectures, combined with its supplementary resources like quizzes and case studies, empower students to engage with the content before face-to-face interactions, promoting deeper understanding and meaningful discussions during classroom sessions.

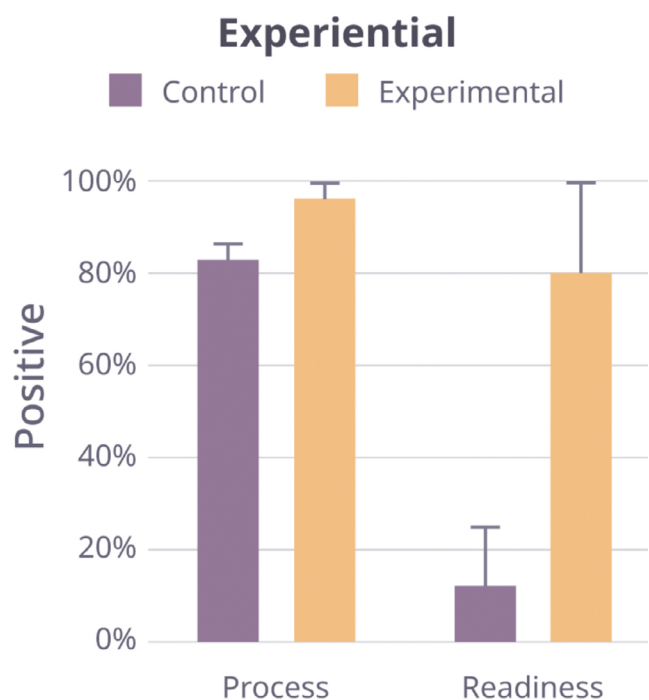
Problem-Based Learning (PBL)

Problem-Based Learning (PBL) is a student-centered instructional approach that focuses on real-world problem-solving. PBL has been studied in different contexts and has been demonstrated to improve student learning. A study on nursing students looking at the impact of PBL on their knowledge, attitudes, and perceptions about patient safety revealed statistically significant differences in those parameters between the two groups ($p=0.001$).⁽¹⁷⁾

Lecturio provides a wealth of resources that can facilitate the implementation of PBL. The platform offers a vast library of clinical case presentations, virtual patient encounters, and scenario-based learning modules. These resources allow students to apply their knowledge and critical thinking skills to solve complex medical cases or clinical scenarios. By leveraging Lecturio's rich collection of case-based learning materials and interactive features, educators can effectively facilitate PBL experiences that encourage active student engagement and promote the development of problem-solving and critical thinking abilities.

A very recent study looked into the impact of front-loading Lecturio content assigned by faculty that were mapped to interactive virtual patient cases in a PBL environment, and tested whether it improved classroom preparedness and satisfaction. Students were split into control and experimental groups, with the latter receiving the assigned content. Those in the experimental group scored higher (83% vs 97%) on experiential questions ($p<0.05$).

"The effect of supplemental videos on PBL session experience was most evident in the student perception of class preparedness [...]. Only 12.5% in the control group felt prepared for the case presentation in class, while 80% of students in the experimental group felt prepared ($p<0.05$)".⁽¹⁸⁾



Team-Based Learning (TBL)

TBL is an instructional strategy that promotes collaborative learning and teamwork among students. In TBL, students are organized into diverse teams that work together to solve problems, analyze case studies, or complete complex assignments. TBL encourages active engagement, critical thinking, and effective communication skills, fostering a supportive and interactive learning environment.⁽¹⁹⁾

TBL has been found to enhance students' end-of-course grades, test performance, and engagement in the classroom, according to previous literature reviews. Students themselves have reported that team-based learning is engaging, facilitates deeper understanding of the subject matter, and better prepares them for assessments and overall course performance.⁽²⁰⁾

A 2017 meta-analysis that included a total of 30 studies, with 17 meeting the criteria for analysis, showed a significant mean effect size estimate of 0.55 ($p < 0.001$) across various measures. Moderator analysis revealed that the size of the groups influenced the magnitude of the effects, with smaller group sizes showing additional benefits. The remaining 13 studies were subjected to a confirmatory synthesis.⁽²⁰⁾

Three studies indicated improvements in class grades, while five studies reported higher final examination grades for students who participated in team-based learning (TBL). Additionally, three studies demonstrated gains from one year to the next when TBL was implemented (with Year 1 representing no TBL and Year 2 representing TBL).⁽²⁰⁾

Furthermore, one study specifically investigated the impact of the individual Readiness Assurance Test (iRAT) and the team Readiness Assurance Test (tRAT) on final examination scores. The findings revealed that students who completed both the iRAT and tRAT performed better than those who only completed the tRAT. This outcome was observed for both above-average and below-average students, suggesting that the combination of the iRAT and tRAT is crucial in enhancing content knowledge outcomes.⁽²⁰⁾

Lecturio's platform offers features that support the implementation of TBL, specifically allowing for iRAT and tRAT tests. Lecturio's quizzes and assessments can be designed to align with the principles of TBL, allowing teams to work together to solve challenging questions or analyze complex cases. Moreover, Lecturio's analytics and progress tracking functionalities provide educators with insights into individual and team performance, enabling them to assess the effectiveness of TBL activities and make data-informed adjustments to optimize learning outcomes.



Scan the QR code to learn more about **Team-Based Learning (TBL)**



How to use Lecturio for TBL
(PDF Handout)

Supporting learners through technology, personalized learning and coaching

Lecturio also embraces personalized learning and adaptive technology to cater to the individual needs and learning preferences of each learner. The platform utilizes adaptive algorithms that analyze learners' performance, progress, and learning patterns to deliver tailored content recommendations and study plans. This adaptive technology ensures that learners receive the right level of challenge and support, maximizing their learning outcomes.

Personalized learning is emerging as an important approach in medical and healthcare education. The field of healthcare is highly diverse, with

learners coming from various backgrounds and possessing different levels of prior knowledge and skills. Personalized learning recognizes and addresses these individual differences by tailoring educational experiences to meet the specific needs of each learner. By assessing learners' strengths, weaknesses, and learning habits, personalized learning can optimize the learning process and enhance knowledge acquisition. It allows learners to progress at their own pace, receive targeted instruction, and engage in activities that align with their individual interests and career goals.

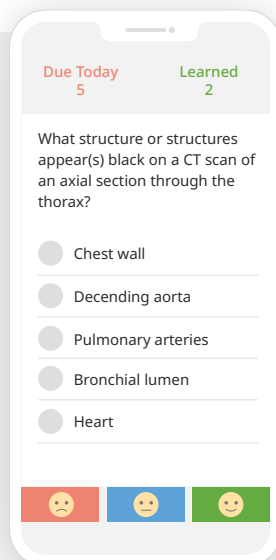


Figure 4: Lecturio Spaced Repetition feature, quiz question(s) that pops up at the end of each Lecturio video and again after the optimal interval to the student when the algorithm determines they are about to be forgotten.

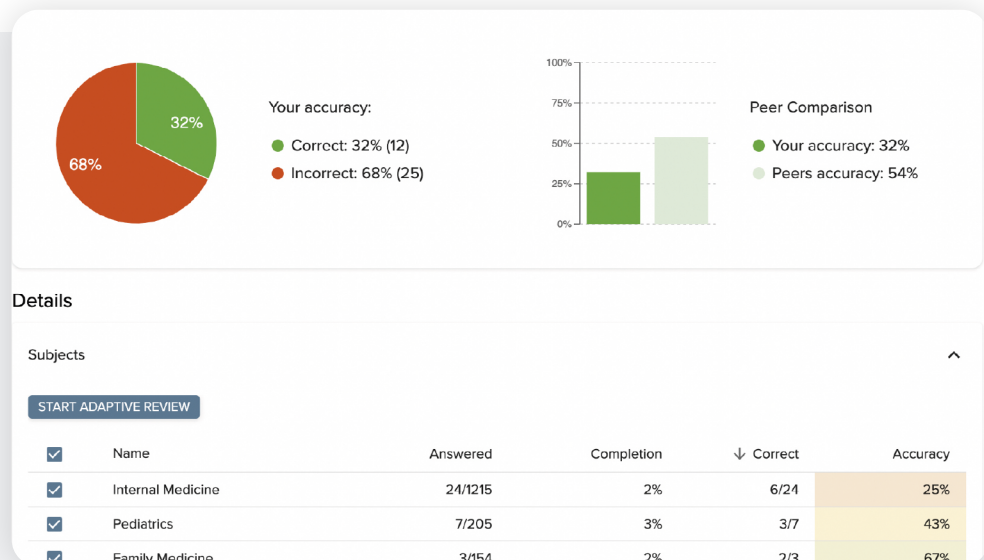


Figure 5: Lecturio Adaptive Review feature, an intelligent algorithm driven feature that provides students a personalized playlist of videos based on questions they got wrong in practice tests

Precision education takes personalization a step further by incorporating data-driven approaches, such as predictive analytics and adaptive learning technologies, to identify areas where learners may struggle and provide targeted interventions. This individualized approach not only improves learning outcomes but also promotes learner engagement, motivation, and satisfaction.

Lecturio's technology adapts the learning pace and difficulty based on each learner's knowledge and performance, providing personalized learning paths. Learners can access targeted learning materials, review specific topics, and receive recommendations for further study, optimizing their learning experience. The ability to customize the learning journey empowers learners to focus on their areas of weakness, thus enhancing knowledge retention and academic achievement.



Scan the QR code to learn more about **Lecturio's intelligent features**.



Intelligent Algorithmic Learning
(PDF Handout)

Lecturio's platform is particularly beneficial for supporting learners of different abilities and backgrounds. Learners can progress at their own pace, receive targeted instruction, and engage in activities that align with their unique interests and requirements. Lecturio is also committed to ensuring the accessibility of its content to learners of different abilities and backgrounds. The platform incorporates several features and approaches to accommodate diverse learning needs.

Potentially At-risk Learners				
		Group	Type	
			All learners	
Name	Risk score	Overdue	Confidence	Accuracy
	10	2		33%
Thiemo Weiser	10	1	Medium	28%
Stefan Wisbauer	5	0	Medium	21%
Erin Gehant	5	0		21%
Adonis Wazir	5	0		22%

Figure 6: Lecturio At-Risk Learners Dashboard, a feature that analyzes students' activities and determines their risk of falling behind based on overdue assignments as well as confidence and accuracy in answering spaced repetition quiz questions.

User detailed information	
BACK TO ALL USERS	
Email	erin.gehant@lecturio.de
First name	Erin
Last name	Gehant
Internal ID	not set
Supervisor (Email address)	not set
Admin role	None
Role	not set
Gender	not set
Date of birth	not set
Region	not set
City	not set
Access expiry	not set
Accommodation time	No accommodation
Phone number	not set

Figure 7: Accommodation time for tests that are held through Lecturio, individually adjustable for students that need additional time to do their test due to neurodiversity or other special needs.

For example, Lecturio provides a variety of multimedia resources, including video lectures, interactive quizzes, and case studies, to cater to different preferences.

Additionally, Lecturio offers closed captions and transcripts for its video lectures, enabling learners with hearing impairments or those who prefer reading to access the content effectively.

Furthermore, Lecturio's adaptive technology and personalized learning approach adapt the learning experience to individual abilities. By analyzing learners' performance and progress, the platform identifies areas of weakness or difficulty and provides targeted interventions and recommendations. These features ensure that

learners receive the appropriate support and resources to overcome challenges and enhance their understanding.

In terms of accessibility for learners with disabilities, Lecturio adheres to web accessibility guidelines and standards, ensuring compatibility with screen readers, keyboard navigation, and other assistive technologies. The platform's user interface is designed to be intuitive and user-friendly, promoting ease of navigation and interaction for individuals with diverse abilities.

Lecturio also recognizes the importance of cultural and linguistic diversity among learners. The platform offers content in multiple languages, allowing learners from different linguistic back-

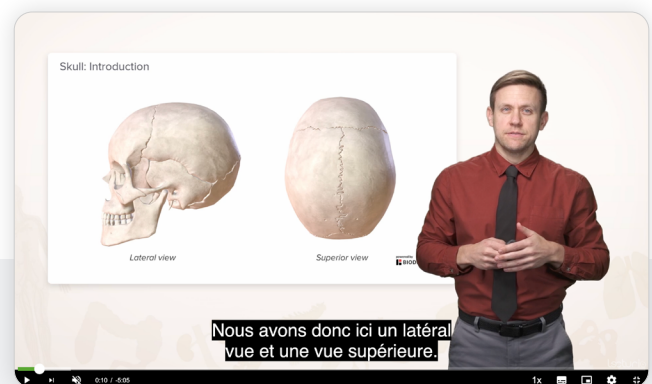


Figure 8: Lecturio closed captioning, built based on the transcripts that are available for all Lecturio videos, and auto-translated into dozens of languages to ensure accessibility of our videos for everyone, anywhere.

grounds to access educational materials in their preferred language. This inclusivity supports learners who may have English as their second language or those who are more comfortable studying in their native language.

In addition, **Lecturio's coaching program** provides learners with personalized guidance and support throughout their educational journey. The coaching program pairs students with experienced mentors who provide one-on-one guidance, academic advice, and motivation. These mentors, often professionals in their respective fields, offer valuable insights and expertise, helping students navigate complex topics and providing clarity on challenging concepts. The coaching program also includes regular check-ins and progress assessments to ensure learners stay on track and make continuous improvements. By offering personalized coaching, Lecturio enhances the learning

experience, fosters student motivation and confidence, and maximizes academic success. Learners benefit from the guidance of knowledgeable mentors who can provide valuable feedback and tailored strategies to overcome obstacles, resulting in improved comprehension, retention, and overall academic performance.



Scan the QR code to learn more about coaching in Lecturio.



Coaching with Lecturio
(PDF Handout)



Learn more about our **Lecturio Coach** offering

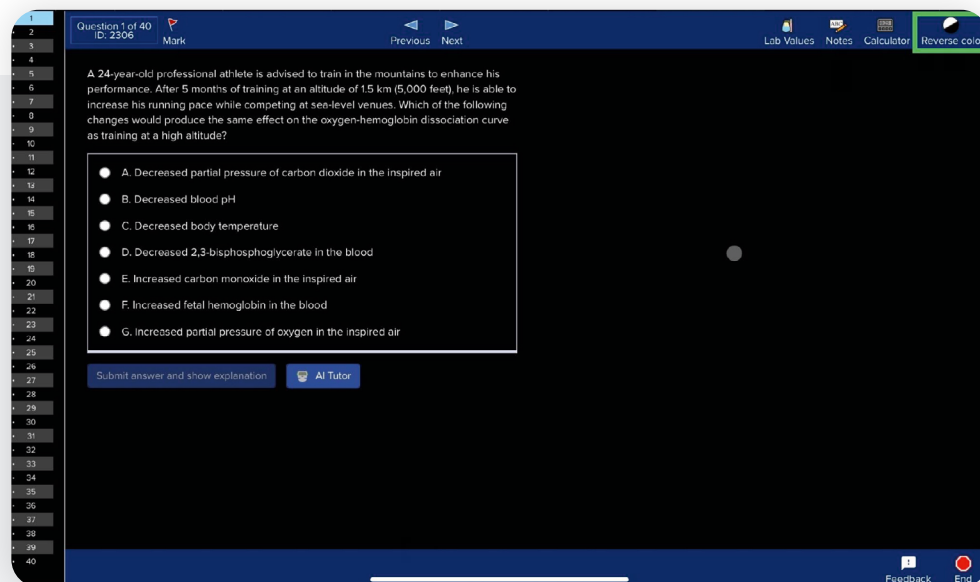


Figure 9: Lecturio reverse coloring for Qbank tests, ensuring high contrast between text and background, supporting readability of the content where it is needed.



Effective Exam Preparation

The declining pass rates in the United States Medical Licensing Examination (USMLE®)⁽²¹⁾ and the National Council Licensure Examination (NCLEX®)⁽²²⁾ raise concerns about the readiness of healthcare professionals. These exams serve as essential assessments for medical and nursing students, respectively, evaluating their competence and eligibility to practice in the United States. The downward trend in pass rates indicates challenges faced by test-takers and highlights the need for effective exam preparation strategies.

The declining pass rates in the USMLE® and NCLEX® exams can be attributed to various factors. These include the evolving nature of the exams, increased difficulty levels, and a lack of

adequate exam-focused preparation resources. The challenges faced by test-takers in adequately preparing for these exams can negatively impact their confidence, academic progression, and future career prospects.

The impact of low scores on healthcare education and the quality of care cannot be overlooked. Students who struggle to pass these exams may face delays in their educational journey, leading to prolonged time to graduation and entry into the healthcare workforce.⁽²³⁾ Additionally, low scores may affect students' confidence and hinder their ability to provide safe and quality care to patients, potentially compromising patient outcomes and overall healthcare standards.

High-yield exam prep tools with Lecturio

Lecturio recognizes the significance of comprehensive exam preparation and offers a wide range of resources tailored to help students excel in the NCLEX® and USMLE® exams. The platform provides extensive review materials, practice questions, mock exams, and targeted study plans to enhance students' exam readiness.

Research studies have consistently demonstrated the effectiveness of exam-focused preparation tools in improving test performance. For instance, a study conducted by Johnson et al. (2019) found that students who used exam-specific resources and practice questions performed significantly better on national licensing examinations.⁽²⁴⁾ Lecturio's exam preparation resources incorporate evidence-based strategies to ensure students are well-prepared and equipped to tackle the challenges of these high-stakes exams.

Lecturio's comprehensive exam preparation resources offer several advantages to students. The platform provides a vast question bank, allowing students to practice and reinforce their understanding of key concepts. Detailed explanations accompany each question, enabling students to identify their strengths and weaknesses, and providing insights for focused study. Lecturio's adaptive algorithms also analyze students' performance and offer personalized study plans to optimize their exam preparation journey.

Every year, Lecturio runs a Self-Assessment Week (SAW) event that allows students to reg-

ister for and undergo a mock USMLE® assessment to help them prepare for their upcoming exams. The SAW of 2023 had the participation of a global cohort of 12,800 students. Based on previous SAW events, Lecturio has collected data on platform usage metrics and student performance, and ran statistical analyses to determine the impact of using the platform and its different features.

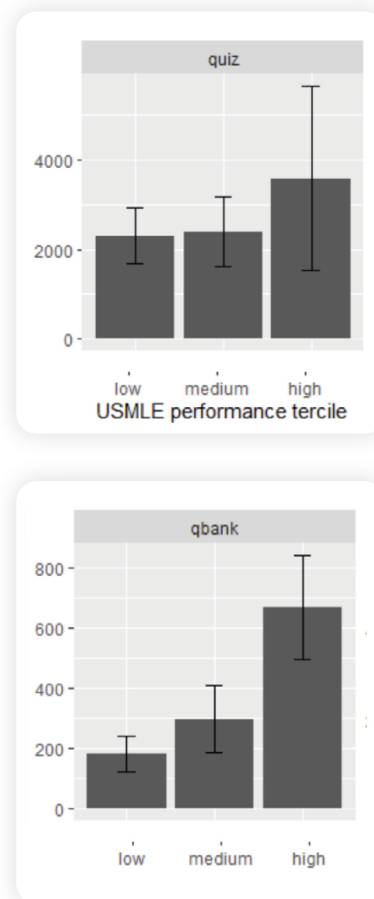


Figure 10. Bar graphs depicting the number of quiz questions and qbank cases attempted by students in the low, medium, and high terciles of performance on the mock USMLE® exam. Each tercile represents 33% of students, stratified by performance score. Error bars represent standard error.

The data showed a positive correlation between quiz question accuracy and qbank usage and performance (figure 10), and a regression analysis that incorporated different usage metrics including those with a positive correlation, revealed statistically significant results for the number of qbank questions attempted ($p < 0.001$) and the accuracy of quiz answers ($p = 0.005$). Those same variables were found to be predictors of passing the exam on logistic regression ($p = 0.002$ and $p = 0.047$ respectively).⁽¹⁹⁾ These results strongly suggest that students who make more use of

the platform and its test-based features (quizzes, Qbank cases) tend to perform better on subsequent examinations.

By leveraging Lecturio's exam preparation resources, students can improve their exam performance, build confidence, and increase their chances of achieving higher scores. This preparation not only benefits individual students but also contributes to the overall improvement of pass rates, ensuring a competent and well-prepared healthcare workforce.

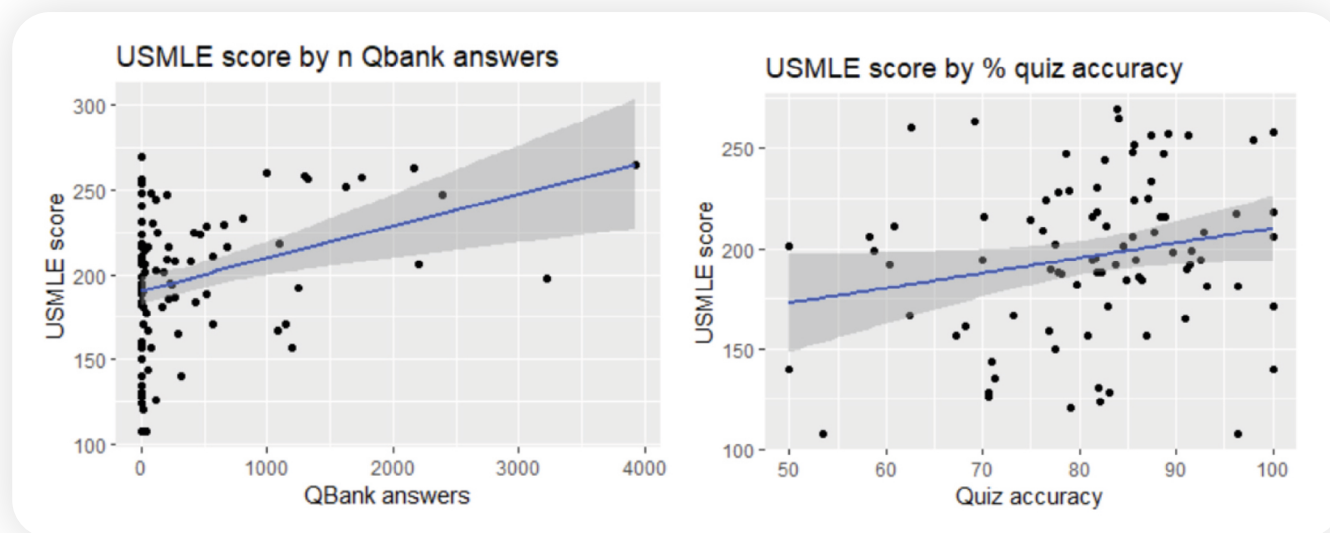


Figure 11: Scatter plots depicting the USMLE® scores for different qbank answers and quiz accuracy, with the line of best fit. β , standard error, t-value, and p-value for Qbank, quiz accuracy were 0.022, 0.005, 4.228, 0.000/ 0.952, 0.333, 2.856, 0.005, respectively.



Global Healthcare Workforce Shortage

The shortage of healthcare professionals is a critical global issue that threatens access to quality healthcare services. Research and reports highlight the current and projected shortage of healthcare professionals across the world. According to the World Health Organization (WHO), there is a projected shortage of 18 million healthcare workers by 2030.⁽²⁵⁾ This shortage is prevalent in various regions, including low-income countries, rural areas, and underserved communities, many of which suffer from inadequate healthcare infrastructure and limited resources.

The consequences of the healthcare provider shortage are far-reaching. The lack of sufficient healthcare professionals hinders access to timely and appropriate care, leading to delayed diagnoses, reduced quality of care, and compromised patient outcomes.^(26,27) It also places a burden on existing healthcare workers, increasing their workload and potentially contributing to burnout and diminished job satisfaction. The shortage further exacerbates health disparities, as marginalized populations face additional barriers in accessing essential healthcare services.⁽²⁸⁾

Combating the healthcare provider shortage

Lecturio plays a vital role in addressing the global healthcare provider shortage by offering comprehensive healthcare education programs and resources. The platform provides a wide range of medical courses, from pre-medical programs to specialized medical training, enabling learners to acquire the knowledge and skills necessary to enter and excel in the healthcare field.

Global health mandates and resolutions have consistently highlighted the importance of strengthening the health workforce through life-long learning opportunities.⁽²⁹⁾ Digital education has emerged as a potential solution to enhance the skills and job satisfaction of healthcare professionals. Lecturio's online platform facilitates anytime, anywhere access to educational materials, enabling learners to overcome geographical barriers and pursue their healthcare education remotely.

Lecturio helps bridge the healthcare provider gap by empowering learners to acquire the necessary skills and knowledge through its comprehensive and high-quality educational programs. By offering specialized medical training and exam preparation resources, Lecturio prepares healthcare professionals to meet the demands of the field. Through these efforts, Lecturio contributes to building a more competent and well-equipped healthcare workforce, ultimately improving healthcare access and quality worldwide.

For example:

Lecturio's Ethiopia project was launched in partnership with the Ministry of Health of Ethiopia and the German Corporation for International Cooperation to support quality and more scalable medical education and capacity building in Ethiopia through digital teaching and learning and custom production of learning content in order to help address the shortfall of healthcare professionals in Ethiopia.

The capacity-building project succeeded in digitalizing the national curriculum, providing an online learning platform equipped with evidence-based resources, producing content with local experts on equipment use and maintenance, offering continuous training and support while continuously maintaining academic integrity, and implementing sustainable cooperation between the public and private sector.

Despite economic, technical, and logistical challenges, such as Internet disruptions and the access divide, periods of unrest in specific regions, and the COVID-19 pandemic, 21 public institutions in Ethiopia with over 8300 active users are currently benefiting from the project and recognizing its value. The project serves as an example of how private-public partnerships can greatly contribute to addressing the needs of healthcare professional education while maintaining the priority of academic integrity.

Effectiveness of Lecturio and Online Learning Platforms

The effectiveness of online learning platforms, such as Lecturio, is supported by a growing body of research and literature. Numerous academic papers, reports, and studies have examined the impact and benefits of online education in the field of healthcare and medical education. These studies provide valuable insights into the effectiveness and potential of online learning platforms like Lecturio.

Studies in higher education and other environments have demonstrated the effectiveness of e-learning.^(30,31) A review of medical, nursing, and dental education research showed mixed results, although some studies demonstrated more efficient learning with e-learning.⁽³²⁾ Another relevant research paper by George et al. (2021) investigated the impact of online learning platforms on medical students' exam performance. The study found that in 12/50 studies, students who utilized online learning resources, including video lectures and practice questions, achieved higher scores on their exams compared to those who relied solely on traditional learning methods⁽²⁸⁾. In terms of student satisfaction, there is plenty of evidence that students enjoy and prefer e-learning approaches with high satisfaction due to "ease of use and access, navigation, interactivity, and user-friendly interface design".⁽³³⁾

This preference for e-learning was corroborated by an internal study of 324 students from seven different schools from four different regions in the world. Thematic analysis revealed three main themes for why students recommend Lecturio: quality of content, ease of use, and helpfulness. Some other common themes include how interesting they found Lecturio materials to be, the fact that Lecturio contains high yield material, how complete the resources are, and the interactivity of the features.

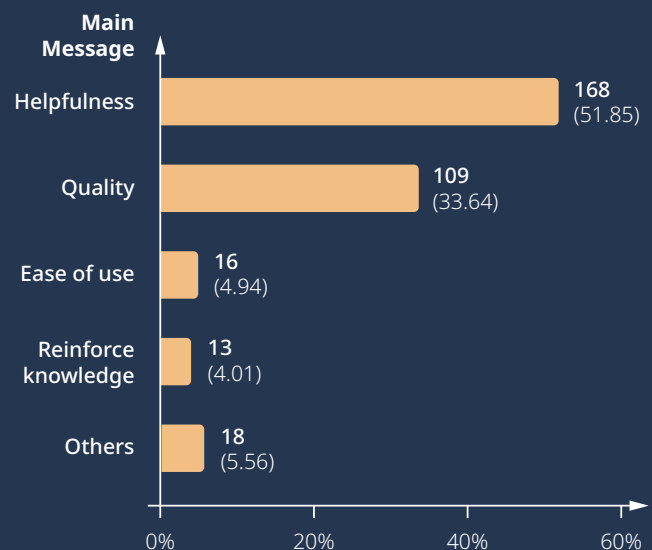


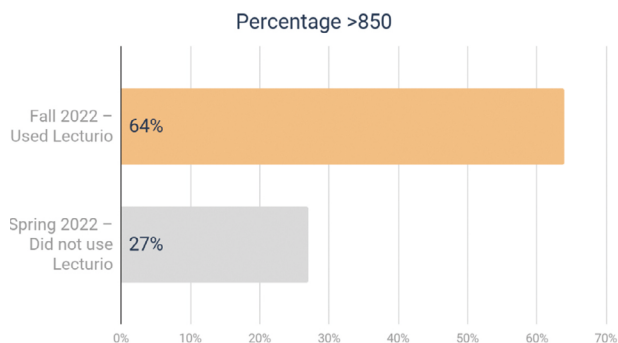
Figure 12: Table and graph showing the reasons users have in recommending Lecturio from an internal study of seven schools representing 4 different regions in the world (Europe, Americas, Asia, Eastern Mediterranean). (n= 324)

In addition to external research, Lecturio itself conducts internal research to evaluate the effectiveness of its platform and resources.

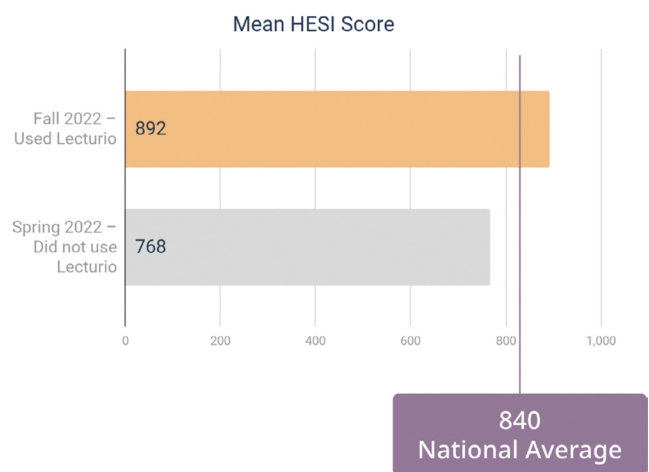
One such project was with a nursing school in the United States, where students undergo rigorous preparation for the Health Education Systems Incorporated (HESI) nursing exam. In this study, the performance of two cohorts was examined: the first, in Spring 2022, did not utilize any supplementary resources, while the second, in Fall 2022, had access to the Lecturio

platform to support their pharmacology course, which was entirely conducted online.

The Fall 2022 cohort, equipped with Lecturio's resources, achieved a remarkable mean score of 892 on the HESI exam, a significant improvement of 19.79% compared to their counterparts in the previous semester, who scored an average of 768. Notably, this Fall 2022 cohort not only surpassed their predecessors but also outperformed the national average score of 840, a testament to the efficacy of Lecturio's supplementary materials.



64% of the students in the Lecturio cohort achieved scores exceeding 850, demonstrating the substantial impact of this platform compared to the 27% in the previous cohort.



These findings demonstrate the effectiveness of online learning platforms like Lecturio in improving learning outcomes, knowledge retention, and exam performance. The integration of multimedia-rich content, interactive features, and adaptive learning technologies contributes to a more engaging and personalized learning experience, supporting learners' educational journey in the healthcare field.

Student Testimonials



Lecturio is very modern and gives high-yield information.



Lectures are concise, to the point and delivered in a clear language.



I like the way information is presented here. We are using a different platform for lectures this semester, and I am still watching the lecturio videos in addition to my other assigned lectures because they are just better.



Lecturio is a great aid to learning with well explained lectures with high yield facts and concept pages with all important information with questions to revise these concepts immediately and help in active recall.



Lecturio made difficult subjects easy to understand and to correlate and use knowledge in clinical scenarios.



I learn a lot from the videos, plus I was able to assess my learnings because of the quizzes. It is very helpful.



The lessons are easy to understand and the videos are concise and informative. I also like that the transcripts are available so we can take notes easily.



Because I am a person with ADHD and I really like studying here because I understand and I don't get bored



Lecturio is a really good educational resource. It offers great lecture video material, practice exams, and great ways to track the material you have reviewed. It lets you know what topics you are proficient at and which need work as well.



Lecturio provides a vast library of high-quality educational content, including video lectures, question banks, study materials, and interactive quizzes.



Transformative Solutions in Healthcare Education

In conclusion, traditional education faces several challenges, including limited accessibility, ineffective teaching methods, declining exam scores, and a global shortage of healthcare professionals. These issues have significant implications for healthcare education, quality of care, and healthcare access worldwide.

Lecturio, as an innovative online learning platform, effectively addresses these challenges. It offers a solution to the lack of accessibility by providing flexible and remote access to high-quality educational resources. Lecturio's interactive and engaging learning experiences overcome the limitations of passive learning, promoting active participation and knowledge retention.

Furthermore, Lecturio's comprehensive exam preparation resources play a crucial role in combating the declining scores in the USMLE® and NCLEX® exams. By providing targeted study plans, extensive question banks, and personalized feedback, Lecturio helps students improve their exam performance and enhances their overall readiness to enter the healthcare workforce.

In addition, Lecturio contributes to addressing the global healthcare provider shortage. Through its healthcare education programs

and resources, Lecturio empowers learners to acquire the necessary skills and knowledge to bridge the gap in healthcare provision. By offering specialized medical training and personalized learning experiences, Lecturio prepares healthcare professionals to meet the evolving demands of the field.

The potential impact of Lecturio in improving education and addressing the challenges in the healthcare field is immense. By harnessing the power of technology, Lecturio has the ability to reach learners globally, breaking down geographical barriers and providing equal opportunities for quality education. As more learners benefit from Lecturio's interactive and personalized learning experiences, we can expect to see improved exam scores, a more competent healthcare workforce, and enhanced healthcare access and quality worldwide.

Lecturio stands as a transformative solution in healthcare education, revolutionizing the way students learn and prepare for exams. Through its comprehensive resources, adaptive technology, and commitment to excellence, Lecturio has the potential to shape the future of healthcare education, addressing the current challenges and ultimately improving healthcare outcomes for individuals and communities worldwide.

Faculty Dashboard

Watched Minutes

884

Viewed Concept Pages

367

Activity

Answered Qbank Questions

238 67% correct

Answered Recall Questions

285 48% correct

Qbank Performance

Total

2137

Correct

Incorrect

Potentially At-Risk Learners

Name	Risk Score	Accuracy
<div></div>	10	13%
<div></div>		19%

Create Course

Title

Anatomy Lecture Series

Image

CHOOSE FILE

Description

CANCEL

SAVE

Course Creator

CREATE COURSE

Anatomy Lecture Series

ASSIGN

Pharmacology

ASSIGN

Physiology

ASSIGN

Learning Path Management

CREATE COLLECTION

IMPORT

Learning Path Collections

Anatomy

Custom

MANAGE PATHS

Physiology

Custom

MANAGE PATHS

End of Course Exam

Imported

MANAGE PATHS

REMOVE



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