

Research on the Teaching Reform and Application of Virus Prevention and Control Technology Course under the Background of “Internet Plus”

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Abstract: With the deepening prevalence of the "Internet Plus" concept, traditional teaching methodologies are confronted with formidable challenges. The rapid advancement of internet technology has propelled the speed and breadth of information dissemination to unprecedented heights, catalyzing innovations across various sectors, with education being no exception. Within the realm of virology and prevention studies, the effective integration of internet technologies for pedagogical reform has emerged as a pivotal issue for many educators. The conventional teacher-centered instructional approach no longer suffices to satiate contemporary students' yearning for information or to cultivate their practical skills. Both academia and the educational community are ardently exploring ways to enhance student engagement and improve practical competencies, thereby adapting to the swiftly evolving demands of the job market.

1. Introduction

In the era of rapid advancement in information technology, the concept of "Internet Plus" has become a buzzword of the times, and this innovative mindset is profoundly transforming various industries. The field of education is embracing this transformation with open arms, particularly in the realm of virus prevention and control technology, where the need for pedagogical reform is becoming increasingly urgent. As the types and quantities of viruses emerge as rapidly as bamboo shoots after a spring rain, the traditional, static teaching models appear ill-equipped to address the ever-changing landscape of cybersecurity. The widening chasm between the skills students acquire in academic settings and the competencies demanded by the industry is a pressing concern, necessitating the adoption of cutting-edge, contemporary teaching strategies. Against this backdrop, the integration of advanced virus prevention technologies into the curriculum is critical for ensuring that education remains aligned with industry developments. By merging online and offline resources, the aim is to cultivate a cohort of versatile professionals who not only meet industry needs but also drive the profound integration of education and technology, thereby illuminating the learning experience with a clear sense of purpose and direction for the future.

2. The impact of Internet+ on course teaching

In the current backdrop of the "Internet Plus" era, profound transformations have occurred in curriculum instruction, particularly in the discipline of virus prevention and control technology, where these changes are especially pronounced. The advent and development of the internet have shattered the barriers to knowledge acquisition in traditional education, expediting the flow of information and enabling the timely updating of instructional content to align with cutting-edge technologies. For instance, as compared to conventional textbooks, students can now directly access the latest virus prevention and control techniques and case studies through online resources and open course platforms, thereby gaining access to global learning materials. This has infused both teaching and learning with a new vitality and timeliness. The internet has equipped education with a plethora of digital tools and platforms, allowing instructors to vividly and vividly illustrate complex technological concepts through multimedia, virtual experiments, and online simulations. The enhancement of interactivity has significantly boosted students' sense of engagement and practical operational abilities. The proliferation of online learning platforms has liberated curriculum instruction from the constraints of time and space, enabling students to choose their learning pace and mode independently, thereby greatly enhancing the flexibility and personalized development of learning. The internet has also profoundly transformed the interactive dynamics and functional models between teachers and students. The relationship is no longer one of unidirectional information transmission but has evolved into an equal and open interactive platform. Within online discussion forums, social media, group projects, and other interactive channels, students can actively express their insights and pose questions, while teachers can adjust their course strategies and methods of knowledge presentation based on student feedback. This dynamic, bidirectional interactive model bolsters students' learning enthusiasm and also fosters the professional development of educators. These changes collectively propel the virus prevention and control technology curriculum from a traditional passive instructional model towards a modern, heuristic, and inquiry-based educational approach, laying a solid foundation for the cultivation of individuals with innovative capabilities and practical skills [1].

3. Analysis of the teaching status of virus control technology courses

3.1. Disadvantages of traditional teaching mode

In the contemporary era of "Internet Plus," the teaching of antivirus technology courses is poised for significant reform. However, the limitations of many traditional teaching models continue to impede the practical efficacy of the curriculum. Traditional pedagogy often relies on a unidirectional transfer of information through lecturing, which leaves students with little room for interaction or critical thought. Consequently, they frequently passively absorb knowledge without truly grasping the intricate principles of virus control technology. Such pedagogical outcomes often result in students applying antivirus technologies superficially, rendering them ineffectual in addressing real-world cybersecurity challenges. With the proliferation of virus variants and the ever-evolving cybersecurity landscape, the periodic nature of textbook updates often prevents them from timely reflecting the latest threat scenarios and mitigation strategies. The knowledge students acquire may unwittingly become outdated, leaving them ill-equipped to confront novel virus challenges. The lack of practical training is another flaw in traditional teaching models, as many courses prioritize theory over practice, depriving students of opportunities to use tools and solve problems in real-world settings [2]. Antivirus technology is an extremely application-oriented discipline, and students without practical training are akin to warriors without swords, lacking the requisite protective capabilities to confront cybersecurity incidents. Lastly, traditional teaching

lacks personalized guidance, making it difficult to meet the diverse needs of students at various levels. Whether for students with weaker foundations or those with deeper comprehension, a uniform teaching pace can lead to diminished motivation and learning outcomes. Students with slower learning paces may fall behind, while others may find the content too simplistic and devoid of challenge. This not only dampens students' interest in learning but also severely restricts the full realization of their potential in the field of antivirus technology. The identified shortcomings of traditional teaching models underscore the urgent need to revamp pedagogical approaches to better align with the demands of antivirus technology education in the new era.

3.2. The gap between students' ability and the demand of job market

Under the backdrop of the "Internet Plus" era, the urgent need for reform in the teaching of virus prevention technologies is evident, particularly due to the widening gap between students' capabilities and the current employment market demands. The deficiency in technical application skills is pronounced, as classroom instruction often focuses more on the transmission of theoretical knowledge, leaving students frequently at a loss when faced with the complex and ever-changing real-world cybersecurity environment. The lack of practical experience restricts their ability to address genuine virus threats, thereby exacerbating the distance between theory and practical application. A second gap emerges in the mastery of emerging technologies; course content updates lag, and the knowledge students acquire is often already obsolete in the market. The industry demands professionals who can swiftly adapt and master the latest technologies, but the lagging curriculum leaves students feeling unprepared and mismatched with market requirements during job searches. Within the realm of virus prevention, relying solely on cybersecurity knowledge is insufficient; the market tends to favor hiring individuals who possess comprehensive capabilities across information technology, data analysis, and business operations. Traditional teaching models, overly focused on a single discipline, result in students struggling to provide comprehensive solutions that meet industry needs upon entering the workforce. Additionally, students' understanding of real-world cyber-attacks is limited to academic discussions due to their sheltered campus environment, lacking practical combat experience. The high-pressure, fast-paced nature of real-world operational environments presents a significant challenge to students both psychologically and technically. The discrepancy between what students learn in the classroom and what companies actually require is evident, as they do not receive adequate training in simulated real-world scenarios, thereby diminishing their ability to handle high-pressure situations efficiently.

4. Specific measures for teaching reform

4.1. Introducing cutting-edge virus prevention and control technology into the course

In the context of the "Internet+", the integration of cutting-edge virus prevention and control technologies into the curriculum of virus prevention and control has profoundly transformed the breadth and depth of teaching, driving the course content closer to reality, sparking students' interest in learning, and simultaneously providing them with an excellent platform to practice emerging technologies. With the rapid development of the internet and information technology, malicious software is becoming increasingly complex and diversified, rendering traditional virus prevention methods inadequate. This necessitates the education sector to keep pace with the times by incorporating the latest prevention and research techniques to update educational content, making it more practical and guidance-oriented. Students are exposed to advanced technologies such as AI-driven threat detection, behavior pattern-based intrusion detection systems, and the application of blockchain in data protection, which not only enriches the curriculum but also significantly

enhances students' ability to solve practical problems. More importantly, this pedagogical reform infuses the course with a practice-oriented approach. Utilizing real-case analyses and simulated cyber-attack environments in the classroom allows students to design and implement protective measures themselves, laying a solid foundation for their entry into the workforce. Leveraging big data from the internet, through the analysis of vast intelligence sources, enables real-time updates to the virus library and protection strategies, cultivating students' data analysis and rapid response capabilities, and enhancing their awareness of risk identification. Sharing insights from industry experts on the latest threats and their solutions, the course not only attains a theoretical altitude but also brims with timeliness [3].

4.2. Combination of online and offline teaching

In the context of "Internet Plus," the curriculum for viral prevention and control technology is undergoing a transformative wave of educational reform, with the integration of online and offline teaching emerging as the cornerstone of this initiative. Online education offers an abundance of resources and flexible learning modalities; various video lectures, online experimental demonstrations, and interactive Q&A sessions available on digital platforms empower students to acquire knowledge anytime and anywhere. This approach is particularly apt for the rapidly evolving field of viral prevention, as it allows for timely updates on the latest viral information and protective technologies. The online learning environment enables students to revisit course material repeatedly, deepening their comprehension and compensating for any gaps in traditional classroom instruction. However, given the highly practical nature of viral prevention technology, solely relying on online instruction proves insufficient for comprehensively cultivating students' hands-on competencies. Offline learning effectively addresses this shortcoming by enhancing students' practical skills and problem-solving abilities through laboratory courses and case analyses. Within a laboratory setting, students have the opportunity to engage with actual antivirus software and observe the behavior of viral samples, making this experiential process crucial for understanding viral characteristics and deconstructing protective mechanisms. Face-to-face instruction also heightens the depth of interaction between educators and learners; through immediate feedback and communication, instructors can provide personalized guidance tailored to each student's unique areas of misunderstanding, thereby facilitating a holistic grasp of complex concepts [4]. Such interaction is particularly vital for addressing emergent viral incidents and equipping students with crisis response abilities. Amidst the "Internet Plus" trend, the hybrid instructional model signifies a more personalized and diversified learning experience. Educators can leverage data gathered online to analyze students' progress and effectiveness, allowing for targeted adjustments to offline course content and practical projects, thus enhancing instructional efficiency. This educational framework nurtures students' capacity for autonomous learning, preparing them to swiftly adapt to the ever-evolving landscape of cybersecurity and emerging viral challenges in their future careers. In summation, the blended teaching reform in viral prevention technology courses plays a pivotal role, broadening the scope of theoretical learning while deepening practical application, thereby establishing a solid foundation for nurturing well-rounded professionals in the field of viral prevention.

4.3. Reinforcement of practical sessions

In the context of the era marked by the "Internet Plus" paradigm, the transformation of the curriculum in virus prevention technologies holds particular significance, with the enhancement of practical training being a pivotal component of these reforms. The rapid evolution of information technology driven by the internet necessitates a stronger emphasis on practical operational skills

within the realm of virus prevention to address the ever-changing landscape of security threats. Consequently, the curriculum design should place a greater emphasis on cultivating practical capabilities, augmenting students' operational skills in real-world scenarios from multiple dimensions. The integration of real case studies constitutes a critical strategy in reinforcing the practical component, enabling students to comprehend the diversity and complexity of virus attacks while honing their analytical and traceability skills. For instance, the renowned WannaCry ransomware attack incident could be incorporated into the curriculum, guiding students through the analysis of its propagation paths, attack methodologies, and corresponding countermeasures. This not only enhances students' insight and judgment but also assists them in applying theoretical knowledge to real-world situations. Utilizing internet technologies, educational institutions can establish virtual environments where students can simulate virus attacks and defense processes within a secure and controlled space. In such an environment, students can freely experiment with various defense strategies, observing their efficacy and shortcomings. Through such simulation experiments, students gain firsthand experience of the entire virus prevention process, from attack detection and analysis to the implementation of countermeasures, truly achieving the objective of learning by doing. Collaboration between academia and industry also serves as a vital means of enhancing practical education. By partnering with information security enterprises, colleges can facilitate student internships or project development participation. Such direct engagement with real-world projects exposes students to cutting-edge virus prevention technologies and tools, and familiarizes them with the operational processes and strategies employed by enterprises in the field. This experiential learning enriches students' practical knowledge and augments their competitiveness in the job market. The utilization of online sharing platforms significantly expands students' practical opportunities and horizons. Leveraging the "Internet Plus" framework, educators can establish an online community, encouraging students to share insights on virus prevention, exchange solutions, and collaborate on large-scale projects. This cross-regional knowledge sharing and collaborative learning foster a more diverse perspective among students, cultivate team spirit, and strengthen their communication skills [5].

4.4. Teaching Evaluation and Feedback Mechanism

In the tide of the "Internet+" era, the pedagogical reform of virus prevention and control technology courses must particularly focus on a core aspect: the effective construction of an evaluation and feedback mechanism. In a field evolving at such a rapid pace, the traditional teaching evaluation methods are ill-suited for virus prevention courses, which demand both practicality and application. For such a discipline requiring precision and swift response capabilities, the reform should primarily consider students' mastery of theoretical knowledge and its practical application, with the evaluation and feedback mechanism playing a crucial role. By optimizing feedback channels, a closed loop of knowledge transmission is achieved. One of the reform measures is the introduction of a dynamic, comprehensive evaluation system, which no longer confines itself to final exams but integrates various methods such as course quizzes, project assignments, and laboratory simulation tests for a holistic assessment. For instance, a simulation experiment involving network attacks and defenses often requires students to apply their knowledge in real-world scenarios, navigating various complex network environments, and teachers provide real-time evaluations based on students' performance in these experiments. This not only tests students' practical skills but also gives them immediate problem-solving opportunities. Students often encounter different levels of difficulties during their learning process, and timely feedback from teachers can significantly enhance learning effectiveness. An effective approach is to utilize information platforms to facilitate online discussions and Q&A sessions, such as through post-class

WeChat groups, forums, or even online live Q&A sessions, where teachers can directly address students' queries and adjust their learning progress as needed. On another level, peer evaluation and group discussions among students are also important forms of feedback, especially in laboratory classes, where students can provide improvement suggestions on their peers' work, fostering collective wisdom and enhancing overall learning effectiveness. The diversification of teaching evaluation reforms, given the high demand for mastery of specific technologies, especially needs to be specially designed in conjunction with the characteristics of virus prevention and control technology courses. These technologies emphasize the rate of updates and the ability to solve practical problems, thus the teaching content should be adjusted based on the latest virus sample databases and network attack forms, and the reform of the evaluation mechanism should also adapt to these changes. Practical teaching focusing on project-based learning and case analysis offers a highly effective approach. This pedagogical reform not only enhances students' response capabilities and skills in the face of real threats but also infuses the curriculum with vitality and practicality, ultimately aiming to elevate the quality of education.

5. Conclusion

In the context of the information age, integrating "Internet+" into the curriculum reform of virus prevention and control technology is no longer an option but an imperative. Introducing cutting-edge technologies to enhance students' practical skills and fostering a dual online-offline educational model are, in essence, driving profound transformations in education. Practice has shown that strengthening industry connections and nurturing students' innovation abilities through diversified teaching methods are effective ways to bridge the gap between students' skills and market demands. The implementation of feedback and evaluation mechanisms allows both teachers and students to promptly adjust their teaching and learning strategies, ensuring the efficiency and high quality of educational activities. The essence of education lies in imparting skills for self-learning, enabling students to become autonomous learners who acquire knowledge and experience through the rapid flow of information on the internet, which is increasingly becoming the direction of education in the new era. Ultimately, this proactive reform will bring multiple benefits to students, schools, and society.

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