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EDTC 814

Leadership Vison and E-Learning Plan

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Introduction

In recent years, the integration of technology into education has revolutionized traditional classroom practices, offering innovative avenues for teaching and learning. E- learning is one such innovation that has a major effect on how education is designed, implemented and delivered (Singh et al., 2005). E-Learning or electronic learning is a type of learning that uses an electronic device such as a computer, tablet or smart phone to deliver part or all of the course in a classroom setting, hybrid or in a distance learning course. E-Learning has greatly transformed our way of learning by the use of the newly developed technologies and applications and has emerged to improve the learning experiences of the learners (Bari et al., 2018). It provides a solution that lets learners tailor their education to their personal lifestyles and enables them to share materials in various multimedia formats and documents (Bari et al., 2018).

One of the most transformative advancements in science education is the use of virtual labs—interactive, computer-based simulations that allow students to conduct experiments that typically take place in physical laboratory settings, in a digitally simulated environment (Badillo et al., 2020). They provide an interactive learning experience in various scientific disciplines, such as biology, chemistry, physics, engineering, environmental science and many more disciplines. Virtual labs can simulate tools, equipment, tests and procedures that are used in physical labs (Badillo et.al., 2020) and help students make connections between science and the real world. Student can conduct many experiments in a virtual environment without the constraints of safety, time and other problems faced by real labs. By using virtual labs teachers are better able to allow capture students' attention and ensure their engagement and motivation (Babateen, 2011).

Despite their proven benefits, many middle school educators are not able to incorporate virtual labs into their curricula effectively due to a lack of training and resources. To address this challenge, I would like to develop a comprehensive E-learning course which is designed to help middle and high school science teachers with the knowledge and skills that are needed to effectively integrate virtual labs into their teaching practices. This course will provide teachers with practical strategies for applying virtual labs so that they are able to enhance student engagement, deepen the understanding of scientific concepts, and foster a more dynamic and interactive learning environment.

Vision

The vision for this E-Learning plan is to empower teachers with the skills and tools that are necessary to effectively integrate virtual labs into their teaching practices. We want to equip teachers with the knowledge to create and deliver cutting-edge science lessons that utilize virtual labs, transforming theoretical concepts into interactive, hands-on experiences. Our aim is to transform traditional science classrooms into dynamic learning environments where students are engaged with interactive simulations, explore scientific concepts in an immersive virtual setting, and develop a deeper understanding of the natural world. We want to increase student motivation and participation through the use of virtual labs that make science more relatable and exciting, thereby bridging the gap between abstract theories and real-world applications.

We envision a future where science education is more accessible, engaging and effective by providing middle and high school science teachers with comprehensive training on virtual labs. We want to ensure that all school teachers, regardless of their technological proficiency or resources, have access to high-quality training on virtual labs, leveling the playing field and

enhancing educational equity. Our goal is to foster a collaborative and innovative community of educators who share best practices, resources, and experiences with each other. We want to create a vibrant community where each member is equipped to inspire curiosity, enhance critical thinking, and promote a passion for science in their students.

Through a blend of instructional content, hands-on activities, and expert insights, this course aims to empower teachers to transform their science classrooms into a dynamic and technology-rich learning space. By bridging the gap between traditional teaching methods and innovative digital tools, we envision a future where every school student will be able to benefit from high-quality, interactive science education. We are also committed to evolve the course content based on feedback, technological advancements, and educational research to ensure that teachers remain updated with the latest technological advancements and receive the most current and effective training.

E-learning plan

This e-learning learning course will provide middle and high school teachers with the knowledge and skills to effectively integrate virtual labs into their science curriculum. It will consist of five modules where teachers will learn about various virtual lab platforms and tools, how to design engaging lessons, and how to assess student learning through these digital platforms. They will be able to understand the benefits and limitations of virtual labs in science education as well as reflect on and share best practices for using them effectively**. Module 1** will be an introduction to virtual labs which will talk about the role of virtual labs in science education and delve into their theoretical and practical aspects. **Module 2** will expose the teachers to different virtual lab platforms available (Labster, PhET, Gizmos etc.) and the features

and functionalities of each platforms via video tutorials. **Module 3** will help teachers in understanding how to integrate virtual labs into their science curricula and in designing lesson plans and activities that leverage the interactivity of virtual labs. A template for lesson planning and sample lesson plans and activities will be provided for guidance. **Module 4** will cover how teachers will assess the students learning and engagement in virtual labs. They will be able to design effective assessments (quizzes, lab reports, and project-based assessments) aligned with virtual lab activities. **Module 5** will provide strategies for successful implementation of virtual labs in the classroom. Teachers will be able to reflect on and share best practices and their experiences.

The course will use e-learning platforms such as Google classrooms, Canvas or Moodle to host the course. The instruction will include a good mix of readings, videos, interactive simulations, and quizzes to engage different learning styles of the educators. It will incorporate discussion boards, peer reviews, and live questions and answers sessions to facilitate interaction and collaboration. Effort will be made to provide a helpdesk or online support for technical issues and course related questions. The course will be regularly updated with new virtual lab tools, case studies, and teaching strategies based on the feedback gained from the participants and keeping up with the rapid advancement in technology. To evaluate participants understanding and application of course content, the teachers will be assessed by quizzes, assignments and a final project where they create and present a detailed plan for incorporating virtual labs into a science unit. A certificate of completion will be offered to teachers who successfully complete the course and demonstrate the ability to effectively integrate virtual labs into their teaching practice.

For this type of an E-Learning course, the leadership style that I will choose will be a mix of transformational and adaptive leadership. Transformational leaders are recognized as change agents who are good role models and who create a clear vision for the organization (Northouse, 2021). This E-Learning course needs a forward-thinking mindset that embraces innovation in teaching practices and communicates a clear vision for how virtual labs can enhance learning. Since teachers may be hesitant to adopt new technology or alter their teaching methods, a leader who is charismatic and visionary will be able inspire and empower the teachers to succeed in times of uncertainty (Northouse, 2021) with examples of innovative uses of technology. Such a leader shows a dedication to the plan and remains persistence in overcoming obstacles and maintains a positive attitude to motivate and support teachers throughout the process. They will be able to provide clear communication about the benefits of virtual labs, offer hands-on demonstrations, and share success stories from other educators. They also implement gradual integration and provide ongoing support to build confidence.

A leader who can implement this course should be able to understand the challenges and concerns of the teachers and a show a willingness s to address those concerns and adapt the course as needed. Since adaptive leaders prepare and encourage people to deal with change, they provide their followers with "the space or opportunity they need to learn new ways of dealing with the inevitable changes in beliefs, attitudes, perceptions and behaviors that they are likely to encounter in addressing real problems" (Northouse, 2021, p.285). As an adaptive leader, I would be open to making adjustments to the course (content or delivery) and provide alternative solutions if any type of challenges arise.

Many teachers lack experience with digital tools and virtual labs, and it would be a good idea to offer them comprehensive training sessions that cover both technical aspects and pedagogical strategies for using virtual labs. It will also be beneficial to include easy-to-follow tutorials and guides for self-paced and self – directed learning. Teachers may struggle to align virtual lab activities with existing curricula and standards. So, this plan will provide support in curriculum integration by offering sample lesson plans and alignment guides. Collaboration with other teachers to adapt virtual labs to their specific subject areas and educational standards will be encouraged. The course will accommodate various levels of resource availability and technical issues with hardware and software. For schools with limited technology, low-tech alternatives will be suggested or phased implementation will be included. It will be insured that robust technical support is available and offers troubleshooting resources. A professional development plan will be put in place that will include follow - up sessions after the initial training and opportunities for teachers to share their experiences and strategies.

Funding

To secure funding for implementing this E-learning course that focuses on integrating virtual labs into middle and high school classrooms, a multi-faceted approach can be employed. There are many educational grants and foundations that could become a crucial funding source for this project. The National Science Foundation (NSF) offers grants for programs that are specifically aimed at improving science education, technology integration or support innovative educational projects and professional development. Additionally, the federal or state Departments of Education often provide grants for educational technology and teacher training programs. Private foundations like the Gates Foundation, the Carnegie Corporation and

the Walton Family Foundation provide grants for educational technology initiatives. A strong, clearly worded proposal complete with the description of the project, including objectives, target audience (middle and high school teachers), course content, and expected outcomes will be submitted for funding. Some local and regional foundations will also be explored for community-specific support.

Corporate sponsorships or partnership opportunities from educational technology companies that develop virtual labs like Labster, PhET or Gizmos can be explored. Major technological corporations such as Google, Microsoft and Intel can provide financial backing or resources, as they often have education-focused grant programs or sponsorships. Science and education organizations, such as the American Chemical Society or the National Science Teachers Association (NSTA) might also be approached funding or support. Crowdfunding and donations through platforms like Kickstarter or GoFundMe or DonorsChoose can engage the broader community, including educators, parents, and community members, who are passionate about improving science education, to contribute to the cause. Participating in educational and technology conferences can help networking with potential funders and partners. Lastly, forming partnerships with educational institutions or professional associations can provide additional resources and collaborative support, enhancing the overall impact of the E-learning course.

Evaluating the economic worth of implementing a course for middle and high school teachers to learn how to incorporate virtual labs into their teaching practices involves a comprehensive analysis of its broad economic impacts. From a cost perspective, virtual labs can reduce the need for expensive physical lab equipment, materials, and maintenance. This could

also potentially reduce costs of the education process administrative time and cost that is needed to maintain a physical lab (Shehata, 2022). It also decreases operational costs related to purchasing, storage, and replacement of physical resources. Integrating virtual labs can streamline processes, often requiring less setup time and effort (Shehata, 2022) and allowing more time for instruction. In terms of revenue generation, integrating virtual labs in the curriculum could attract more students due to the innovative and technology-rich educational experiences offered, potentially increasing school funding. This is especially true for private schools as schools that offer innovative, technology-rich educational experience attract more students, potentially increasing funding through higher enrollment. When teachers become proficient at integrating virtual labs in their schools, it could indirectly bring about a lasting economic impact on the whole school.

The course for teachers also opens new opportunities by providing access to advanced simulations and experiments that may not be feasible with physical equipment, thereby enriching the educational experience and enabling teachers to employ innovative teaching methodologies to create more engaging environments. Virtual labs support remote and hybrid learning models, allowing students in various locations to access high-quality science education. Moreover, they enhance educational processes by offering interactive and personalized learning experiences that improve student engagement and understanding. While the teachers gain dynamic tools that support effective teaching and creativity through this course, the students benefit from the teacher's learning and experience. By using virtual labs teachers can increase the engagement, motivation, improve critical thinking skills of their students. They can make complex scientific concepts easy to understand and achieve a higher level of scientific literacy (Ismail, et al., 2016; Jannati, et al., 2018). They can also adapt their lessons to individual learning styles. Thereby,

providing tailored educational experiences that cater to the diverse needs of the students. Graduates of this course can be instrumental in promoting equity by ensuring all students, regardless of their school's funding or location, have access to high-quality resources and by providing support to underserved schools. This course will equip the teachers with resources so they can design their lessons to be culturally sensitive, accommodating diverse learning needs and backgrounds.

Conclusion

Implementing the E-learning course to integrate virtual labs into middle and high school classrooms represents a significant opportunity to enhance teaching and learning and in modernizing science education. This course is meticulously designed to provide educators with the essential tools, resources, and support needed to effectively incorporate these innovative technologies into their classrooms. By offering comprehensive training on virtual lab platforms, lesson design, and assessment strategies, we aim to empower teachers to deliver more engaging and interactive science education. By leveraging virtual labs, we aim to provide teachers with innovative tools that reduce costs, create new opportunities, and improve both educational and administrative processes. This plan will not only support effective teaching and student engagement but also promote equity by offering advanced learning resources to all students, regardless of their school's resources.

To ensure the effectiveness of the E-learning course, a comprehensive evaluation strategy will be implemented which will focus on several key areas. Teacher proficiency and satisfaction will be assessed by giving the teachers a pre-and post -training survey that will measure their skills and confidence relating to using of virtual labs. Also, we will monitor their

participation in training sessions and follow up workshops. Increased teacher proficiency in integrating virtual labs into their curriculum and positive feedback on the training process will be an important indicator of the success of this program. Surveys, focus groups and academic performance data will used to evaluate changes in students engagement and learning outcomes. A measure of the program's success will be improved student engagement, higher performance scores in science subjects, and positive feedback from the students. Finally, the overall program impact will be reviewed through comprehensive assessments from teachers, students, and administrators, aiming to identify improvements in teaching practices, student learning experiences, and overall satisfaction with the virtual labs program. Cost savings and resource utilization will be tracked by analyzing reductions in physical lab material costs and improvements in administrative efficiency. The successful implementation of this course will ensure that science education can evolve to meet the needs of today's students and prepare them for the challenges of tomorrow. It will not only improve the quality of science education, but also contribute to the development of future scientists and critical thinkers.

References

Babateen, M. H. (2011). The role of virtual laboratories in science education. *ResearchGate*. Retrieved from https://www.researchgate.net/publication/228442866_The_role_of_Virtual_Laboratories_in_Science_Education

Badillo, J., Londino-Smolar, G., & Savvides, P. (2020). 7 things you should know about virtual labs. *Eli.* Retrieved from https://library.educause.edu/-/media/files/library/2020/8/eli7174.pdf

Bari, M., Djouab, R., & Hoa, C. P. (2018). Elearning Current Situation and Emerging Challenges. *PEOPLE: International Journal of Social Sciences*, 4(2), 97-109. Retrieved from https://d1wqtxts1xzle7.cloudfront.net/72222664/0fe8dd63d9f3adfd7c252c70eb49554ea5a1-libre.pdf?1633979731=&response-content-disposition=inline%3B+filename%3DElearning_Current_Situation_and_Emerging.pdf&Expires=1723422348&Signature=WuAKO0LrMfFOI2SDnE~QDNRMfEFMLpyLbmAct~-kKDYWNe1xACaSQ8QPNeLy~1DtwqNHS~ryc5L~Z2SHE14NUPXMjTIg199zyY9~8LFPcMDstv9mHo3-WQZZ2UWnJp1EFvjSicI~9xetfy7yWmK0KqrxnRcHrl548dcsgZ2BrV8U-BWIASt2vXMzMeik03De5upH81~0Ef66mSCLJSLwyPEB-a8FTRmW5y3hTkzdVGdv8ENIEy8XiAZ3bHPOgHS9yF5q7seuvn-WTErR9~WOHJXul8v7PnRFK49ttM2C7F63T4z9LzeOFvGZf8zA636Oxg3gMQQHnDSXwQDasuqqqA__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

Ismail I, Permanasari A, Setiawan W. (2016). Stem virtual lab: An alternative practical media to enhance student's scientific literacy. *Jurnal Pendidikan IPA Indonesia.* 5(2): 239–246. Retrieved

from https://www.researchgate.net/publication/322366233_Stem_virtual_lab_An_alternative_practical_media_to_enhance_student%27s_scientific_literacy

Jannati ED, Setiawan A, Siahaan P, Rochman C. (2018) Virtual laboratory learning media development to improve science literacy skills of mechanical engineering students on basic physics concept of material measurement. *Journal of Physics: Conference Series.*1013(1): 012061. Retrieved from https://www.researchgate.net/publication/325192050_Virtual_laboratory_learning_media_development_to_improve_science_literacy_skills_of_mechanical_engineering_students_on_basic_physics_concept_of_material_measurement

Northouse, P. G. (2021). Leadership: theory and practice. Ninth Edition. Los Angeles, SAGE Publications.

Shehata, S.B. (2022). E-learning and One of Its Applications (Virtual Labs). *PraxiLabs*. Retrieved from https://praxilabs.com/en/blog/2019/12/18/e-learning-and-one-of-its-applications-virtual-labs/#:~:text=Modern%20teaching%20methods%20vary.,costs%20of%20the%20education%20process.

Singh, G., O'Donoghue, J., & Worton, H. (2005). A Study Into The Effects Of eLearning On Higher Education. Journal of University Teaching & Learning Practice, 2(1). Retrieved from https://ro.uow.edu.au/jutlp/vol2/iss1/ 3