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"Barriers to online teaching and learning in computer science"

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Abstract:
The rapid increase of "technology and population makes it seem inevitable that e-education will become the primary agent of educational change shortly." In recent years, there have been a plethora of studies into methods of improving "the quality of learning outcomes in e-education, and it has been addressed from a variety of angles, with a full assessment of research and survey data offered by various e-learning institutes.""This document attempts to provide a taxonomy of hurdles to e-learning," as well as offer acceptable solutions for each barrier identified. There are four types of roadblocks in general. 1. The Learners are subdivided into "categories such as financial difficulties, motivation, progress evaluation, isolation from peers, insufficient skills and experience in distance learning, attachment, and social domains, among others." Teachers face significant difficulties such as a lack of proper understanding of the e-teaching environment and difficulty assessing distinct domain progress in their classrooms. 3. "Curriculum issues such as uncertainty, quality, resources, teaching procedure, and evaluation." 4. "The school itself, including organizational and structural elements." 5. More collaboration between "related factors, such as curriculum developers, teachers, parent's students, social service agencies and technological specialists" is required to overcome these groups of barriers. "This includes preparing virtual and actual interaction between children and teachers, as well as interaction with the rest of society."

Keywords: "education, e-learning, educational hurdles, e-teaching, computer science."

1. INTRODUCTION

"Teachers and administrators must rethink delivery tactics and instructional approaches to meet the demands of today's students" (Garcia et al., 2018). The success of distance education is attracting a growing number of firms using it to assist their employees in developing and enhancing their skills and knowledge. At an astronomical pace, online education and online teaching are taking off. Everywhere you look, e-learning enterprises are sprouting up. There is tremendous growth in this subject, but no standards have yet been established or even agreed upon. E-learning, as its name implies, "is any kind of education that is offered via the use of computers or other electronic devices." A wide range of learning goods, "such as those given through computer, intranet, internet, satellite, or other distant technologies," might fall under this umbrella. "Instruction is given electronically fully through a web browser, over the Internet or an intranet, or through CD-ROM or DVD multimedia platforms," says prominent e-learning researcher Brandon Hall. "Web-based training — or

learning goods supplied through a web browser via a network — is now the only widespread concept of e-learning." (Mogili and Deepak, 2018) (Mogili and Deepak, 2018). According to the investment research team, e-learning technology fully utilizes the Internet's distribution potential and "urges investors to see the (e) in e-learning" as standing for "effective."

"Synchronous and asynchronous e-learning are two terms used to describe e-learning." Both phrases describe "the degree to which a route is limited by location or time. "For example, when you attend live training, such as a class or workshop, the event is synchronous since the event, and the learning co-occurs or at the same time."" Asynchronous training, on the other hand," occurs when two events occur "not at the same time." Online courses that allow you to finish activities at various times and communicate through time-delayed email or discussion group posts are called asynchronous learning (Wang et al., 2018). It's essential to consider the unique challenges and obstacles associated with each kind of this categorization before beginning a course of study.

2. METHODOLOGY

"**Creating and implementing e-learning programs."**

"Courses, Seminars, Workshops, Online learning portals, Chat sessions/Discussion groups and other e-learning products are all examples of e-learning products that are designed and developed with a careful combination of personnel resources, hardware and software specifications and applications, standards for interactivity, and media integration, and design parameters based on user capabilities" (Bravo et al., 2018). "Developers that create e-learning products often have a specified set of resources allocated to design and production," as well as established production schedules and timetables, which are followed religiously. "Organizations contemplating developing their products should keep in mind that these resources are also necessary for the development and implementation of e-learning." The curriculum developer should be familiar with the curriculum creation process, "technical, pedagogical knowledge (TPCK), topic knowledge, the location where the course will be designed and delivered, and the learners." Educators should be familiar with the qualities of their students, as well as their developmental tasks and age (Jobanputra et al., 2019). Learners are one of the most significant variables in education, and they must be adequately understood and completely.

3. RESULTS

Learners

The learner is one of the most crucial variables in any educational setting. In reality, we educate students on how to learn in the classroom. Students enrolled in e-learning courses are separated from their teachers. As a result, in addition to the common problems such as mental and physical preparation, they face various other difficulties and hurdles that may dampen their passion for learning (Ottenbreit-Leftwich et al., 2021). Some of these obstacles and challenges were discovered by research conducted at Country University, which included the following:

3.1 Learners' self-assurance and proficiency in utilizing computers

Age and educational background impact a learner's ability to use computers effectively. The following are the results of a study aimed at adult learners: The poll indicated that most E learners were confident in their ability to use a computer. Nearly half (46%) said they were delighted in their ability to "use computers for a wide variety of activities, while four in ten (49%) characterized themselves as somewhat confident." More "men than women described themselves as computer literate," and more men than women said

they felt confident in their computer skills (54 percent compared with 39 percent of women). There were also disparities in confidence between the young and the elderly, lower the former. Less than a fifth of students aged 44 and more (29%) and a quarter of those aged 34 to 46 (39%) felt highly comfortable using computers compared to almost half of those aged 15 to 19. It (Weintrop et al. 2019) If you're developing e-learning courses, you need to consider how confident students are with computers and whether or not they require pre-education before beginning the class, depending on where they are located. Computers are more often used in certain nations than in others.

3.2. At-home access to computers

Before beginning the course, we must inspect the learner's living quarters to ensure enough amenities. It is one of the most critical things for learners to consider while communicating effectively. According to the results of a study conducted on adult learners in Iran, more than eight out of ten students (83 percent) "had access to a computer at home and had used it for their college course" (Ellahi et al., 2019). This was most prevalent among people under 24 and those who did not have any disabilities or learning challenges. "The great majority of learners who have access to a computer at home" (84 percent) "reported that they had internet access, with broadband being the most" often used means of connection. "Learners who had access to a computer at home, in particular, were significantly more computer confident and were more likely to use information and communication technology (ICT) more extensively at college as well as at home."“Those who did not have access to a computer at home were not necessarily using college computers to make up for lack of access to a computer at home, as a third of these learners (36 percent) said that they had never used a computer while attending college." Consequently, "one of the other critical learning aspects is having access to the internet and a computer, which should be confirmed before beginning the course."

3.3. "College students may use computers."

In addition to arranging equipment at home, we must ensure that computers are available for use at school or college before beginning the course. Another significant component that might aid in the learning process is the preparation of services to maintain the equipment. (Ceri et al., 2018) "Researchers discovered that somewhat more than three-quarters of learners (88 percent) were utilizing computers at college, whereas almost a quarter of learners (34 percent) said that they had never utilized the campus computers." The majority of students who used computers at college expressed satisfaction with their access to computers: "three in ten said it was always feasible to get on a computer, while two in ten said it was generally possible to do so." Moreover "three-quarters of those who utilized college computer equipment." However, the technology was of high enough quality to be used for all of their college studies.

3.4. Computer and information technology use attitudes

Researchers surveyed adults about their opinions "regarding using computers in the classroom and more conventional learning techniques." Computer use was seen favorably by students, who saw its advantages. Students (80%) "said they liked to learn using a range of media rather than simply reading books or listening to the tutor, and around two-thirds of students (66%) said they performed better in assessments when they used computers to study rather than reading books or listening to the teacher" (76 percent). "Because of the way computers were utilized in their course," 78% of respondents indicated they had more

options for where and when they studied (Scanlon and Connolly, 2021). In addition, 79% of students agreed that using computers helped them understand their classes better, while just 30% said that computers hindered their learning. It wasn't a whole substitute for face-to-face interaction and conventional classrooms, "but computers were widely acknowledged to provide more options, a better comprehension of the subject matter, and a higher quality of assignments." Instead of relying just on textbooks and lectures, most students preferred to study via a variety of media. There is still some distance to go until all students utilize computer technology for learning and communicating, which should be considered.

4. DISCUSSION

The teaching staff

E-learning is, as previously said, instruction that is delivered via the use of electronic media such as the Internet. A range of settings, such as homes, schools, and public places like libraries and cafés, may host it. It isn't limited to the hours of the school day. "There are numerous administrative and strategic procedures required to support teaching and learning in an Internet environment that are part of e-education, such as e-teaching and e-learning" (Zendler and Reile, 2018). International, regional, and national perspectives will be included. So, what kind of team is required to design and execute an e-learning system? It is common to have instructional designers, visual artists, programmers, or authors as well as a website or database professional who can administer and maintain "the courseware via a learning management system (LMS) or a basic online learning portal engaged" (Michell et al., 2018). "Every one of them has to be aware of educational concerns and have adequate knowledge about their pupils and their development stages, as well as know what their developmental" duties are. "We need a curriculum planner on this team to assist the team in considering the curriculum creation process in detail, such as assessing curriculum needs, setting objectives, creating material, and lastly establishing an evaluation system" (Garay et al., 2019). Additionally, we must consider the circumstances in which our students and instructors will be able to think creatively and flexibly. We need to think about providing students with opportunities for creativity and entrepreneurship while studying.

eLearning competencies should describe the necessary knowledge, abilities, and dispositions. This competence framework is for individuals "who are directly engaged in the administration and delivery of curricula, such as teachers, trainers, and policymakers." Coaches, mentors, librarians, and the rest of the instructional support staff will all benefit from this information as well. "As the potential of these technologies is recognized and new expectations are placed on those who assist learners and on the learners themselves, their usage for educational purposes is becoming more common" (Rachmatullah et al., 2020). Consequently, teachers' skills and the additional skills they need in a knowledge society should be considered while developing the curriculum.

All persons engaged in education and training will recognize the activities, assessments, and evaluations of programs. Instead of focusing only on technical skills, organizations now recognize the need to prepare employees for future changes in roles and responsibilities and the acquisition and development of new skills. Society's progress and the previously unimaginable possibilities provided by technology drive these transformations. Teachers and trainers are using new strategies and technologies to meet the community's needs for better accessibility, inclusivity, and learner-centered pedagogy.

5. CURRICULUM

To assist the learning sector, "the curriculum of the E-Learning Branch should be established cooperatively and by technical, pedagogical content knowledge (PCK) and pedagogical content knowledge (PCK)."

- "Enhancing the province's learning program and using technology in education;."
- "Supporting people, procedures and infrastructure in the delivery of programs, managing projects and ensuring accountability;."
- "Providing a variety of consulting and advising services;."
- "developing and implementing policies, good practices, and aids for the educational sector, developing and implementing;"
- "The Learning Sector's provincial networks;
- ."
- "To help teachers and students alike, the province is promoting an innovative learning environment via a variety of professional development strategies that make use of a wide range of methodologies and technology;"
- "Resources that assist teaching and the accomplishment of learning objectives should be identified, evaluated, developed, recommended and distributed."

Tasks that need topic experts and teachers to function as instructors, authors, designers, editors, and instructional designers are daily in classroom-based curriculum creation. Processes are generally iterative, relying mainly on participants' prior experience and iterating until the best possible method is achieved through time (Sharma et al., 2021). eLearning's substantially greater resource commitment necessitates a more extensive and in-depth phase of curriculum creation that involves a larger group of people. The needs of a more diversified student population and their employers/parents must be considered while conducting a needs analysis. Detailed plans and curriculum documentation must be in place to generate material in any order and by various team members using their specialized talents (Bjrner, 2018). Your job has never been more critical or challenging as a project manager. In a typical team, a project manager, a curriculum specialist who ideally has IT abilities, "a web designer with complementing educational skills, an IT services representative, administrative assistance, and access to an outside reviewer are all included."

To be acceptable for online delivery, the suggested curriculum outline must fulfill specific requirements; "it must be centered on knowledge transfer and the development of cognitive and social skills.""E-content may not be ideal for societal growth, but we must take into account the importance of students and instructors interacting" (Ruthotto et al., 2018). To keep students interested and involved, instructors often use project-based learning to break up long, dense content sections. In some instances, such as acquiring fundamental language or keyboard abilities, online learning may be used to practice skills. "When group work is required, specialized resources in the Learning Management System (LMS) are needed." In the same way, an LMS must be utilized for testing and evaluation and if monitoring progress is crucial.

6. EITHER A SCHOOL OR A LOCATION WHERE ONLINE EDUCATION IS BEING DELIVERED

When it comes to "creating and delivering e-learning courses, a variety of tools are needed." An "infrastructure capable of supporting many users and networked applications," as well as components and software applications. End-users need much fewer resources. To produce e-learning, we must follow the standard

procedure strictly. People named above must have access to hardware and software tools for the design and development (Ivanovi et al., 2018). Development workstations and a networked server are often required for "collaborative development.""Additionally, if hosting services are provided, a hosting infrastructure must be in place, including main and backup servers as well as the necessary connections for hosting online courses and the management programs needed to monitor and track use" (Goncharow et al., 2021). "Software resources include authoring software, web editing tools, graphics creation tools, numerous browsers, scripting applications, and learning management systems."

7. CONCLUSION

"Distance education is not a new endeavor; yet, this kind of education, like conventional systems of education, has its own set of challenges and requirements that must be taken into consideration to achieve our learning objectives.""In this global community in which we live, education should not be tied to a certain location such as a school, rather, all learners should be lifelong learners, and education should not be restricted to a specific time or location." Students should be taught how to study and what to learn in a new educational environment. It should inspire students to think critically and creatively to succeed. "Aside from these requirements, E-education, like any other kind of education, has its own set of obstacles that should be recognized and taken into consideration.""Like any other aspect of curriculum creation, we must understand the variables that are successful, such as our learners and their characteristics, their developmental age and tasks, their requirements, their objectives, and their level of motivation.""We should be familiar with our teachers and their requirements, as well as their skills, capabilities, and requirements. We need to be aware of the features and process of curriculum creation, PCK, and TPCK, as well as the many evaluation and assessment systems and meanings available." We must be aware of the location and the equipment that will be required for the design and delivery of the course. "Beyond all of this planning, we must remember that a lack of sufficient connection between students and instructors should not result in kids feeling isolated and anxious about not understanding the material."

8. REFERENCES

1. Bjørner, D. (2018). To every manifest domain a CSP expression–a rôle for mereology in computer science. *Journal of logical and algebraic methods in programming*, *94*, 91-108.https://doi.org/10.1016/j.jlamp.2017.09.005
2. Bravo, G., Farjam, M., Moreno, F. G., Birukou, A., & Squazzoni, F. (2018). Hidden connections: Network effects on editorial decisions in four computer science journals. *Journal of Informetrics*, *12*(1), 101-112.https://doi.org/10.1016/j.joi.2017.12.002
3. Ceri, S. (2018). On the role of statistics in the era of big data: A computer science perspective. *Statistics & Probability Letters*, *136*, 68-72.https://doi.org/10.1016/j.spl.2018.02.019
4. Ellahi, R. M., Khan, M. U. A., & Shah, A. (2019). Redesigning curriculum in line with Industry 4.0. *Procedia computer science*, *151*, 699-708.https://doi.org/10.1016/j.procs.2019.04.093
5. Garay, G. R., Tchernykh, A., Drozdov, A. Y., Garichev, S. N., Nesmachnow, S., & Torres-Martinez, M. (2019). Visualization of VHDL-based simulations as a pedagogical tool for supporting computer science education. *Journal of Computational*

Science, *36*, 100652.https://doi.org/10.1016/j.jocs.2017.04.004

6. Garcia, R., Falkner, K., & Vivian, R. (2018). Systematic literature review: Self-Regulated Learning strategies using e-learning tools for Computer Science. *Computers & Education*, *123*, 150-163.https://doi.org/10.1016/j.compedu.2018.05.006
7. Goncharow, A., Mcquaigue, M., Saule, E., Subramanian, K., Goolkasian, P., & Payton, J. (2021). CS-Materials: A system for classifying and analyzing pedagogical materials to improve adoption of parallel and distributed computing topics in early cs courses. *Journal of Parallel and Distributed Computing*, *157*, 316-330.https://doi.org/10.1016/j.jpdc.2021.05.014
8. Ivanović, M., Milićević, A. K., Aleksić, V., Bratić, B., & Mandić, M. (2018). Experiences and perspectives of Technology-enhanced learning and teaching in higher education–Serbian case. *Procedia Computer Science*, *126*, 1351-1359.https://doi.org/10.1016/j.procs.2018.08.086
9. Jobanputra, C., Bavishi, J., & Doshi, N. (2019). Human activity recognition: A survey. *Procedia Computer Science*, *155*, 698-703.https://doi.org/10.1016/j.procs.2019.08.100
10. Mäntylä, M. V., Graziotin, D., & Kuutila, M. (2018). The evolution of sentiment analysis—A review of research topics, venues, and top-cited papers. *Computer Science Review*, *27*, 16-32.https://doi.org/10.1016/j.cosrev.2017.10.002
11. Michell, D., Szabo, C., Falkner, K., & Szorenyi, A. (2018). Towards a socio-ecological framework to address gender inequity in computer science. *Computers & Education*, *126*, 324-333.https://doi.org/10.1016/j.compedu.2018.07.019
12. Mogili, U. R., & Deepak, B. B. V. L. (2018). Review on application of drone systems in precision agriculture. *Procedia computer science*, *133*, 502-509.https://doi.org/10.1016/j.procs.2018.07.063
13. Ottenbreit-Leftwich, A. T., Kwon, K., Brush, T. A., Karlin, M., Jeon, M., Jantaraweragul, K., ...& Bhattacharya, P. (2021). The impact of an issue-centered problem-based learning curriculum on 6th grade girls' understanding of and interest in computer science. *Computers and Education Open*, *2*, 100057.https://doi.org/10.1016/j.caeo.2021.100057
14. Rachmatullah, A., Wiebe, E., Boulden, D., Mott, B., Boyer, K., & Lester, J. (2020). Development and validation of the Computer Science Attitudes Scale for middle school students (MG-CS attitudes). *Computers in Human Behavior Reports*, *2*, 100018.https://doi.org/10.1016/j.chbr.2020.100018
15. Ruthotto, I., Kreth, Q., Stevens, J., Trively, C., & Melkers, J. (2020). Lurking and participation in the virtual classroom: The effects of gender, race, and age among graduate students in computer science. *Computers & Education*, *151*, 103854.https://doi.org/10.1016/j.compedu.2020.103854
16. Scanlon, D., & Connolly, C. (2021). Teacher agency and learner agency in teaching and learning a new school subject, Leaving Certificate Computer Science, in Ireland: Considerations for teacher education. *Computers & Education*, *174*,

104291.https://doi.org/10.1016/j.compedu.2021.104291

17. Sharma, K., Torrado, J. C., Gómez, J., & Jaccheri, L. (2021). Improving girls' perception of computer science as a viable career option through game playing and design: Lessons from a systematic literature review. *Entertainment Computing*, *36*, 100387.https://doi.org/10.1016/j.entcom.2020.100387
18. Wang, D., Liang, Y., Xu, D., Feng, X., & Guan, R. (2018). A content-based recommender system for computer science publications. *Knowledge-Based Systems*, *157*, 1-9.https://doi.org/10.1016/j.knosys.2018.05.001
19. Weintrop, D., & Wilensky, U. (2019). Transitioning from introductory block-based and text-based environments to professional programming languages in high school computer science classrooms. *Computers & Education*, *142*, 103646.https://doi.org/10.1016/j.compedu.2019.103646
20. Zendler, A., & Reile, S. (2018). The effect of reciprocal teaching and programmed instruction on learning outcome in computer science education. *Studies in Educational Evaluation*, *58*, 132-144.https://doi.org/10.1016/j.stueduc.2018.05.008