A Technological Skills Gap: What Can We Do About It?

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In the last thirty years, education has transformed faster than ever before. As a society we have developed new classroom technologies that allow for better communication and access to more information than ever before. However, at the same time, education seems rockier than ever before. Several major companies, including Tesla, Apple, Google and Netflix, no longer require a college degree for employment, and many companies, such as Amazon, Google, and Microsoft, have begun programs to train their own employees in skills and create their own certification programs to help employees learn necessary skills (Akhtar, O'Donnell). Why do these major corporations not rely on the tried-and-true models of education? What makes the classroom of the 21st century so different than the centuries past? What can colleges do to improve our education system to meet the needs of these employers?

Historical Background

Little has changed in the methods of the delivery of education since the founding of the educational system in the 12th century, where the concept of being lectured to was seen as the only way to gain a university level education (Hamlin 10-11). In 1874, the concept of distance education began with the 'Society to Encourage Studies at Home' located in Boston. They would mail information between students around the country and professors allowing for people in all areas to have access to collegiate education. In 1953, the first televised classes began out

of the University of Houston (onlineschools.org). In 1971, National University was founded and offered the first courses arranged around the schedule of working adults providing one-month classes with an instructor who had experience in the field (Hamlin, 11). Also in 1971, the first personal computer was introduced with the internet following in 1983 (computerhistory.org, usg.edu). In 1989, University of Phoenix was the first fully online college institution to provide bachelors and master's degrees, but Jones International University, the first fully accredited fully online institution, started in 1996 (onlineschools.org). The first online learning management system and interactive whiteboard were introduced in 1990 (Kelsey, Yoshida). Notice these innovations are getting closer and closer together. This timeline of events does not include all the software and technology changes that have occurred since the 90s at a much faster rate.

Starting roughly thirty years ago, the internet and the PC began dominating the college classroom, creating a new world for sharing information. Each year numerous programs, apps, and hardware are released with the intention of making it easier for users to find and learn new information. The tools of academia have changed with the times. Why is it then, in a world surrounded by technology, that our major tech companies are not relying on the resources of the universities, the traditional go-to for trained intellectuals, to build their systems?

What are employers looking for?

Studies find that the graduates these educational institutions are producing are not what employers are looking for. The global economy demands citizens who are educated and possess strong critical thinking, adaptability, and communication skills (Alshare). In one study, it was found that graduates are significantly lacking in listening, problem solving, communication, leadership, interpersonal, analytical, self-management, numeracy, and critical thinking (Abbasi). Along with soft skills, the number of people qualified to fill the positions has also become an

issue with 90% of hiring managers reporting that it is difficult to find and hire the right tech talent. This skills gap, which over three quarters of those surveyed see as growing, is preventing our graduates from being all they can be for their employers. This comes at a major cost, as 83% say the lack of qualified candidates is affecting company revenue growth. That does not mean that current workers are not ready to reskill. 77% report that they are ready to learn new things, but less than half of people with postgraduate degrees and just over a quarter with secondary education degrees say their employer gives them the opportunity. This is reinforced by a separate study that suggests 41% of employers report focusing their reskilling on high-performing employees and 33% of employers prioritize helping at-risk employees to grow to meet the need. In other words, the people who most need the help, will not get it (Rozin). By 2030, the United States is expected to lose $8.5 trillion because of talent shortage and the skills gap (InStride). So, what can colleges and universities do to help bridge this gap and create better suited workers for the technology and other industries?

What have colleges done about it?

The education system has been slow to address the skills gap and because of that, many major organizations such as Google, have taken the approach that a Computer Science diploma does not fully represent a candidate. The soft skills are not necessarily being addressed, nor are the numbers of qualified candidates needed with both soft skills and subject knowledge available (Kidder).

At the same time, unemployment rates for new Computer Science graduates were at 7.8% in 2021. This was due to employers feeling that the curriculum that colleges teach was outdated with a focus on low level programming and theories/fundamentals, with a lack of the right tech skills to do the job. This along with the lack of experience, how quickly technology evolves, and

the ability to outsource or hire workers from foreign countries makes it challenging for new graduates to catch a break (Kidder). This feeds a cycle of potential and current students not seeing the value in a college education and not going to/returning to higher education. College admission has been dropping for a decade. To stay relevant and ensure our universities start to grow again and thrive, we must adapt to the changing world and help to close the skills gap (Nadworny, Nietzel).

Potential Solutions

All is not lost in the realm of traditional education. Colleges must take this opportunity to adapt to the new world in which we are living. In Denmark and Norway, the governments mandated that employer panels are brought in to advise universities on all academic programs. This has been shown to help improve the quality of education. However, it has come with concerns about a university's autonomy over their course offerings (Kvilhaugsvik, Bridging Higher Education and the World of Work? Employer Panels in Nordic University Governance). Even if this extreme is not taken, increasing corporate partnerships to help keep colleges on the cutting edge and make sure that the graduates produced are graduating with the strong skill needed for 21st century employers is of high importance. Using these partnerships, student research opportunities and apprenticeships should be encouraged because they allow students to get the hands-on experience of the skills needed to get a job. It also helps to develop those career-ready skills which makes students better suited for employers. Industry resources also help colleges suffering from often declining budgets to give students the most up-to-date education possible with modern resources and current field knowledge (Comevo, Kvilhaugsvik Bridging the Digital Skills Gap: Proceedings of the 2019 ACM Conference on Innovation and Technology in Computer Science Education).

Increasing these partnerships can also help to develop curriculum in higher education to help teach soft skills and to foster growth of students. Having teachers adopt the role of facilitators of students gaining knowledge as opposed to lecturers would also assist in student development. Using both low-tech and high-tech active learning simulations to allow students to develop those skills needed to succeed has shown promise in the classroom. Case studies where students used a game to simulate running a business to encourage entrepreneurial and soft skills showed promise of qualitative learning outcomes. This 'gamification' of learning was shown to increase students understanding of the material and desired outcomes compared to a control group (Costin, Marillo-Zamorano). Students learn more by doing than they do by listening or even observing.

Conclusion

Academia needs to take a good look at what content it offers and what it is doing to assist in bridging the skills gap and returning quality workers for our nation's industries. Education was once recalling facts and applying them to a situation. Now, it is far more rooted in problem solving, and this shift in paradigm has been slow to catch on. Through reflection and a redesign of current teaching methodologies, we can develop and invest in employees that companies are looking for and keep colleges and universities more relevant in the 21st century.

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