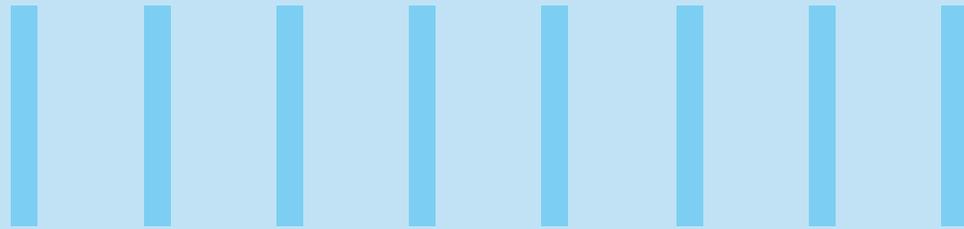




# 3 MEGA TRENDS IN HIGHER EDUCATION

Adaptive Learning, Makerspaces, and Open Educational Resources



## Executive Summary

As technology makes its way deeper into education, institutions both big and small are increasingly trying to improve learning outcomes for their students. Traditional classrooms are undergoing significant change as they align to the needs of industry. The demand today is for employees across ages to be always learning, adaptive, curious, empathetic and innovative. Education institutions are fostering these qualities and influencing learning outcomes through three mega trends, namely adaptive learning, makerspaces, and open educational resources (OER). The benefits of these learning trends can be felt by institutions and students by way of increasing retention rate in the education institution and successful course completion for the student.

## Adaptive Learning

As personalization makes its way into the education industry, adaptive learning will become core. Adaptive learning tools which use elements of machine learning will facilitate modification of learning experiences based on a student's ability and understanding. These tools will visualize student progress in real time and recommend learning activities based on individual student progress. Adaptive learning will also allow faculty to intervene and adjust more quickly when students are struggling to comprehend a subject.

## Makerspaces

Makerspaces are facilitating a whole new generation of creators. They are bringing together experts and novices from a variety of disciplines to design, build, invent, and rethink various products. Using technologies such as extended reality (XR) a combined environment of real-and-virtual space and human-machine interactions generated by computer technology and wearables.

## Open Educational Resources (OER)

Everyone has the right to education, and open education resources (OER) offer high-quality teaching, learning, and research materials that are free for people everywhere to use and repurpose. Adopting OER enables educational institutions to reduce the costs associated with higher education.

Adaptive learning, makerspaces, and open education resources will have major impact on the future of higher education. Education institutions should rightly invest in evaluating and implementing these education solutions to maximize outcomes for students.

## Introduction

Education has traditionally relied on a teacher-centric approach where lectures were the main source of knowledge transfer. Today, learner-centric pedagogies are being embraced to better prepare learners for workspaces powered by technology. However, improving student outcome, instruction, and fostering qualities such as continuous non-disciplinary learning continues to be a significant challenge in higher education.

## Adaptive learning

Adaptive learning refers to technologies that monitor student progress, use data to modify instructions any time, encompass personalized learning, and leverage learning analytics.

Adaptive learning technologies dynamically adjust to the level or type of course content based on an individual's skill attainment, in ways that accelerate a learner's performance with both automated and instructor intervention.

Adaptive learning tailors educational content and activities to the particular needs of a student, and increases the likelihood

of progress for the learner. Intelligent adaptive learning technologies are the most promising initiative for improving the quality of learning for a student.

Emerging adaptive learning technologies and data related to real-time assessments have captured the attention of educators. These technologies can adapt to a student in real time, and provide both instructors and students with actionable data with the use of machine learning. The goal is to move students through a learning path, empower active learning, target at-risk student populations, and assess factors

affecting completion and student success. Adaptive and competency-based learning and predictive analytics increase student retention and student success.

### Teach to the student, Not to the class!

Adaptive learning technologies aim to support educators to provide the best possible learning experience to every single student, and scale the benefits of education to thousands of students at a time.

## Types of adaptive learning

- Adaptive content: When a student answers a question, and receives feedback based on their specific response without changing the overall sequence of skills.
- Adaptive sequence: Continuously collecting and analyzing student data to automatically change what a student sees next; from the order of skills a student works on to the type of content received.

- Adaptive assessment: Changing the questions a student sees based on his or her response to the previous question.

The Infosys digital solution ensures student success by offering adaptive learning using the Infosys NIA platform. This AI-powered platform offers learning content according to the students' knowledge of the subject and delivers personalized learning paths to

maximize outcomes. It also captures learner activities as per industry standards and provides actionable insights into student information. Complementing Infosys NIA is a predictive analytics solution that can help faculty to intervene at-risk students at the right time.

## Makerspaces

The makerspace trend has rapidly spread internationally, with many higher education institutions adding facilities to create maker communities.

Makerspaces are workshops that provide tools and learning experiences to help students and even others implement their ideas. These spaces are used to reinvigorate and repurpose classrooms to meet the needs of the future. In the makerspace landscape, creativity, design, and engineering make their way to the forefront of educational considerations, as tools such as 3D printers, robotics, 3D-modeling, and web-based applications. Makerspaces help engage learners nurture higher-order problem-solving through hands-on learning.

An emphasis on tangible innovations and inventions has brought makerspaces to the forefront of academic priorities. Makerspaces transform the educational landscape by promoting a hands-on aspect of learning. It offers an experiential learning environment that supports the development of future-ready skills, such as collaboration, critical thinking, creativity and innovation, communication, and problem solving.

Makerspaces enable students to design, prototype, create, and iterate using computers, power tools, 3D printers, arts and crafts, and electronics. Makerspaces use both traditional and technological tools. They have also brought a playful, active, and hands-on dimension to the student experience. Makerspaces can potentially become a crucial bridge between universities and industry, particularly in science, technology, engineering, and math (STEM) careers.

There is no “one size fits all” version of academic makerspaces.

There is no “one size fits all” version of academic makerspaces, however, some institutions have created guides with recommendations on tools and equipment, space configuration, furniture, maker pedagogy resources, and project ideas.

Infosys Foundation USA, a non-profit organization focused on bridging the digital divide in America, launched its Infy Maker Awards program. The program is part of an ongoing commitment from Infosys Foundation USA to spark the spirit of making in everyday learning, and to celebrate makers of all ages across the United States who demonstrate creative excellence.

To promote an environment of innovation Infosys Foundation USA partners with Maker Ed, a non-profit organization supporting educators and communities, to provide training and support to one hundred teachers and instructors from grantee organizations across the U.S. These leaders will become Infosys-Certified Maker Educators and support the Makerspaces.

Infosys has also instituted the InfyMaker Awards which seek to encourage the concept of ‘Making’, and acknowledges individuals who have interesting or innovative solutions for real-world issues with a knack towards leveraging technology to make things easier.



## Open Educational Resources (OER)

Open Educational Resources (OER) are teaching, learning, and research materials in any medium – digital or otherwise – that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions.

Open educational resources are openly licensed text, media, and other digital assets that are useful to teach, learn, and assess as well as research. They are publicly accessible materials and resources for users to re-mix, improve, and redistribute under licenses.

Open educational resources include full courses, course materials, modules,

textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge.

Everyone has the right to education.

### For students

OERs offer free access to some of the world's best courses and even degree programs. They also offer huge cost savings as alternatives to expensive textbooks.

### For teachers, ministries of education and governments

OERs provide free and legal access to some of the world's best courses. Educators can then

adapt them to local languages and cultures and use them as a basis for innovation.

### For people of all ages and backgrounds

One doesn't have to be a teacher or a student to understand the importance of OERs. Free information is a fundamental human right, and OERs make it possible for people of all ages and backgrounds to learn more about the world around them and access the tools they need to improve their lives and livelihoods.

OERs have expanded the possibility of education beyond the traditional model. At Infosys, the ability to provide on-demand, decentralized learning is vital to maintaining our culture of always on learning. We partnered with two top MOOC platforms to offer tailored courses for our students, and launched Lex, a platform with hundreds of courses to offer anytime, anywhere learning.



## Conclusion

As emerging technologies such as artificial intelligence and automation take over the workplace, the skill requirement is changing. Adaptive learning, makerspaces, and open education resources have the potential to foster the right kind of curiosity needed for students to be constantly learning. They also help break the mold of linear education-to-employment method in which students

learn, make learning modular and allowing students to learn at their own pace even through nontraditional methods.

Education institutions can leverage a host of Infosys digital solutions, develop innovative content and cater to the expanding needs of students and industry, this will ensure learning is more personal and that the success rate is high.

## Author Profile



### Borra Satya Sresha Srinivasa Rao

Principal Consultant - Domain Consulting Service Group, Infosys

Borra is a domain consultant with more than 20 years of experience in education sector helping education institutes achieve student success. At Infosys, Borra helps clients to implement industries best practices and improve ROI. Borra holds masters in computer application.

For more information, contact [askus@infosys.com](mailto:askus@infosys.com)



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