

THE IMPORTANCE OF DISRUPTIVE TECHNOLOGIES IN E-COMMERCE FOR HIGHER EDUCATION

Ioan-Matei PURCĂREA¹

Abstract

Digital transformation strategies are used by fast-growing higher education institutions to create and manage financially sustainable business models, improve overall efficiency and value, manage transition to a more sustainable and resilient future, as well as to overcome financial obstacles. By integrating disruptive technologies in their activities, universities play an essential role in shaping a more ambitious digital agenda, enabling students to achieve their goals and expand their opportunities, while clearly rethinking and reprioritizing budgets in the knowledge-intensive industry. Rapidly accelerating technology advances and in times of potential crisis and opportunities, higher education institutions need to stay relevant in a changing digital environment, deploy new innovations to engage, support and train students, as well as to deliver flexible and accessible tailored products and services in a more efficient way to the educational consumers. In this context, e-commerce occurs at both university and student's convenience, improving and expanding the methods in which expectations are met and identifying key factors to student satisfaction and retention.

Keywords: Disruptive technologies, Higher education, E-commerce, Digital transformation

JEL Classification: D83, I23, L21, L81, M31, O31, O33

1. Introduction

In the Artificial Intelligence (AI) age where the relationship between knowledge and society is deeply transformed by game-changing technologies, profoundly impacting societies, industries and businesses, higher education institutions need to adapt in order to remain relevant on the essential roadmap to success. In this context, redefining the meaning of leadership and empowering higher education through disruptive technologies such as AI, while avoiding needless costs and a better nuanced understanding of efficient workflows, is highly important for the re-envision of the organization as a reflection of its success,

¹ PhD Candidate, Institute of National Economy, Romanian Academy, Romania, matei.purcarea@rau.ro

developing an ecosystem with new reconfigurations regarding the common language of work, personalizing learning and promoting equity.

In the long term, prioritizing a profound digital transformation approach alongside innovative data embedded processes enable higher education institutions to operate in a more flexible and resilient way that can help overcome today's challenges and brace for the future ones. In order to exceed students' expectations (from the technology enthusiast's perspective), higher education institutions have to improve student experience through integrating e-commerce into their digital platforms, rethinking end-to-end processes and make sense of disruptive technology opportunities.

Technological advancements have transformed the way students learn and interact with educational content. Some of the most significant disruptive technologies include Virtual and Augmented Reality, Artificial Intelligence (AI), Machine Learning, Cloud Computing and Blockchain.

Virtual and Augmented Reality technologies provide a more immersive and interactive learning experience, allowing students to engage with content in a more meaningful way. An example would be that virtual reality can simulate real-world scenarios, while augmented reality can overlay digital information onto the physical world.

AI and Machine Learning are also transforming higher education, having the ability analyze data and personalize the learning experience for each student, providing real-time feedback and support. AI and Machine Learning can also identify areas where students need extra help, allowing instructors to provide additional resources and support.

Cloud Computing is making higher education more scalable and flexible. Cloud Computing allows educational institutions to store and access data and applications from remote servers, enabling them to scale up e-learning platforms and services.

Blockchain allows higher education institutions to create secure and tamper-proof digital credentials, such as certificates and diplomas. These credentials can be used to verify the qualifications of students and ensure the authenticity.

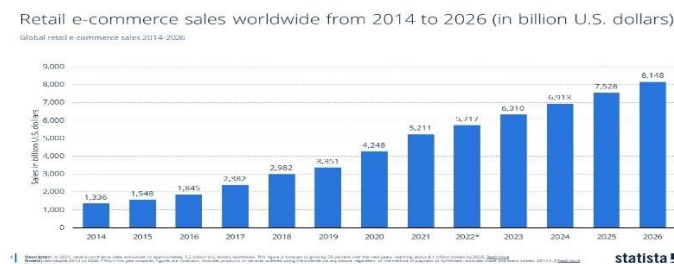


Fig. 1. Retail e-commerce sales worldwide from 2014 to 2026 (in billion U.S. dollars)²

² Retrieved from: <https://www.statista.com/study/10653/e-commerce-worldwide-statista-dossier/>

Statista's data on retail e-commerce sales worldwide from 2014 to 2026 highlights a significant increase in the revenue generated from online sales. According to the data, global retail e-commerce sales amounted to 5.7 billion US dollars in 2022 and are expected to reach 8.1 billion US dollars in 2026 [1]. This growth can be attributed to several factors such as the increasing adoption of smartphones, the rise of e-commerce platforms and marketplaces, and the changing consumer behavior and preferences towards online shopping. The data suggests that the e-commerce market will continue to grow and constantly evolve, creating new opportunities and challenges for businesses operating in this digital landscape.

Benefits of e-commerce among global consumers as of February 2022

Main benefits of online shopping worldwide 2022

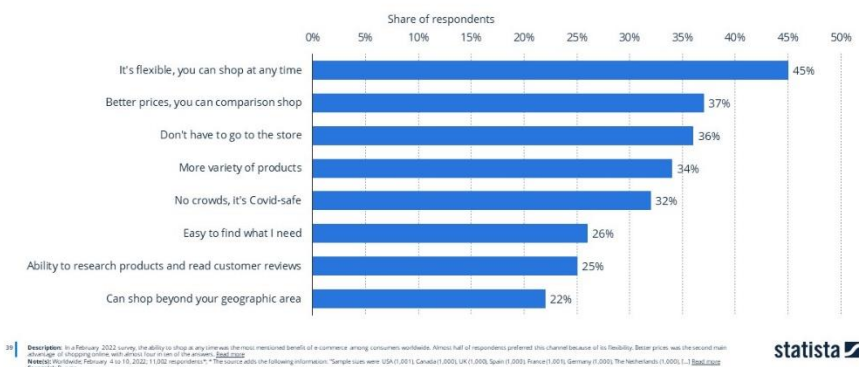


Fig. 2. Benefits of e-commerce among global consumers as of February 2022³

According to Statista's data on the benefits of e-commerce among global consumers as of February 2022, the most significant advantages of online shopping include *flexibility, better prices, more variety, no crowds, easy to find, the ability to research and read customer reviews*, as well as time-saving due to the fact that you can *shop beyond your geographic area* and *don't have to go to the store* [2], highlighting the growing importance of e-commerce as more and more consumers are turning to online shopping to meet their needs.

2. Meeting students' expectations, augment and empower them through disruptive technologies giving way to a new learning experience

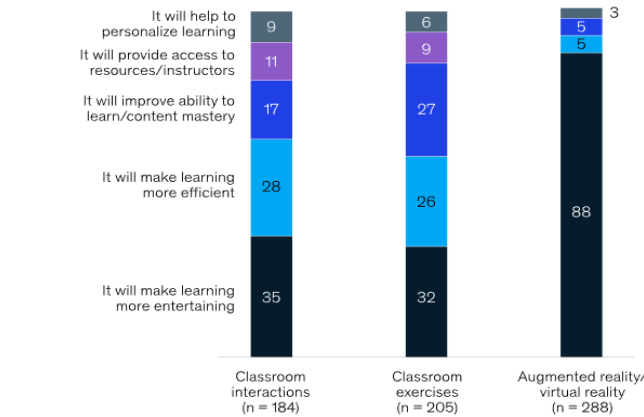
Achieving a system of effective collaborative learning through disruptive technology can be done by creating and following carefully the ambitious digital strategy the University agrees to implement, developing commitment to digital-first pathway.

³ Retrieved from: <https://www.statista.com/study/10653/e-commerce-worldwide-statista-dossier/>

Disruptive technologies in e-commerce for higher education can help institutions increase their efficiency, reduce costs, improve accessibility, enhance student personalization, engagement and learning outcomes, as well as better target and serve the needs of the students and faculty.

Students in higher education are most excited about tools that make learning more entertaining and efficient.

Why students are excited about using learning technology in the future,¹ % of student respondents²



Note: Chart shows data for three of the eight technologies studied.
¹Question: What is the primary reason you are excited about the technologies you selected?
²Figures may not sum to 100%, because of rounding.
Source: Nov 2021 McKinsey survey of 634 faculty members and 818 students from public, private, and minority-serving colleges and universities

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Fig. 3. Why students are excited about using learning technology in the future⁴

The above figure (Fig. 1.) from McKinsey & Company indicates the fact that many higher education institutions show interest in supporting student learning by using more relevant technologies, while the top three impediments emerged are insufficient deployment capabilities, lack of awareness and cost.

McKinsey & Company highlights in its article entitled “How technology is shaping learning in higher education” the findings from a study conducted over a ten-day period (including 634 faculty members and 818 students) that show eight dimensions of the learning experience higher education must address in order to engage effectively with students [3].

⁴ Retrieved from: <https://www.mckinsey.com/industries/education/our-insights/how-technology-is-shaping-learning-in-higher-education>

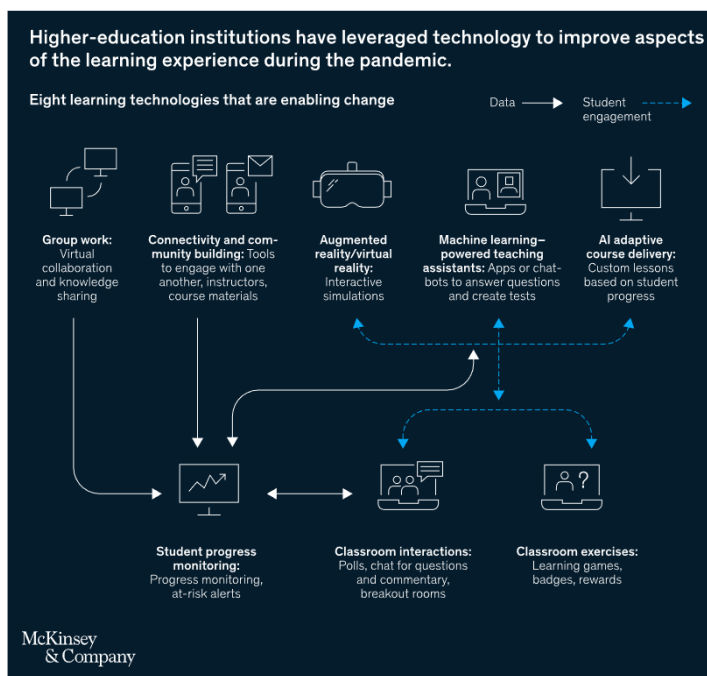


Fig. 4. Eight learning technologies that are enabling change.⁵

The eight dimensions of the online learning experience across three general principles are as follows:

1. Seamless journey
 - 1.1. Clear education road map
 - 1.2. Seamless connections
2. Engaging teaching approach
 - 2.1. Range of learning formats
 - 2.2. Captivating experiences
 - 2.3. Adaptive learning
 - 2.4. Real-world skills application
3. Caring network
 - 3.1. Timely support
 - 3.2. Strong community

⁵ Retrieved from: <https://www.mckinsey.com/industries/education/our-insights/how-technology-is-shaping-learning-in-higher-education>

The importance of institutional performance is recognized through the willingness of higher education institutions to embrace new innovative approaches that lead to real steps in developing an aspirational shared vision for change, creating a sense of urgency in inspiring new digital actionable plans in the organizational baseline.

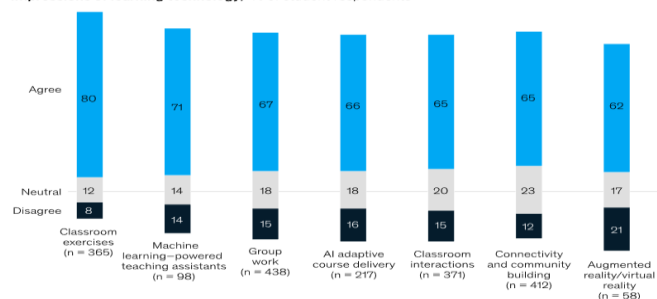
Higher education institutions need to form a shared vision of the future and identify the full potential to perform at its best, increase student enrollment and retention, empower leaders to drive transformation and tailor student satisfaction, crucial for the overall organizational improvement.

According to Purcarea I.M., there is a strong direct link between the growth of a business and the successful e-commerce business, improving the customer experience, as well as a real need to stay informed about new trends, shaping e-commerce in relation with the future of data economy. According to the author, the Founder and CEO of Attrock emphasized that in the constantly becoming larger landscape of the digital marketplace it is important to consider key factors in building a successful e-commerce business, such as [4]:

- delivering a seamless online shopping experience thanks to both a mobile-friendly online store;
- focusing on a niche audience and obtaining real insights for the necessary e-commerce marketing strategy and to the right distribution channels;
- grabbing customers' attention based on high-quality and diverse content;
- doing effective personalization efforts to ensure the improved CX;
- updating continually the segmented email lists and valorizing recipients' feedback.

All the learning technologies analyzed are viewed positively by most students.

Impressions of learning technology,¹ % of student respondents



Note: Student progress monitoring is not included, because it is not used by students.

¹This technology helps me to improve my learning and my grade.

Source: Nov 2021 McKinsey survey of 634 faculty members and 818 students from public, private, and minority-serving colleges and universities

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Fig. 5. Impressions of learning technology⁶

⁶ Retrieved from: <https://www.mckinsey.com/industries/education/our-insights/how-technology-is-shaping-learning-in-higher-education>

Figure no. 3 highlights the fact that students agree that learning and grades have significantly improved since they've started using learning technologies in their classroom due to the COVID-19 pandemic.

Higher education institutions face increasing pressure to meet students' expectations and provide them with the skills and knowledge they need to succeed in a rapidly changing world. Disruptive technologies offer numerous opportunities for institutions to augment and empower their students by providing innovative, personalized, and engaging learning experiences.

One way that institutions can leverage disruptive technologies to meet students' expectations is by adopting online and blended learning models. Online learning allows students to access course materials and collaborate with their peers and instructors from anywhere, anytime, while blended learning combines face-to-face instruction with online learning, providing students with flexibility and personalized learning experiences. These models also offer opportunities for institutions to provide more affordable education and improve access to education.

Another way that higher education institutions can use disruptive technologies to augment and empower students is by incorporating virtual and augmented reality, and other immersive technologies into their courses, providing immersive experiences that help them visualize complex concepts.

Higher education institutions can also use data analytics and machine learning to personalize learning experiences, identify at-risk students, and provide targeted interventions to help them succeed.

3. Disruptive technologies acting as a bridge between e-commerce and higher education

E-learning programs have been developed and implemented by a wide range of universities, being cost-effective in terms of expansion and endeavor. In this context, disruptive technologies bring into place new attributes that are recognizable superior, bringing growth and new opportunities to higher education institutions not only in terms of curriculum but also in the way universities respond to students' needs and demands. Thereby, e-commerce offers the environment to engage, deliver and measure, along with digital experience enablement for students, unlocking larger opportunities with new digital strategies.

E-commerce for higher education refers to a wide range of activities such as:

- E-tail: makes higher education more accessible, affordable, flexible, and innovative;
- Digital marketing: allows higher education institutions to reach a wider audience, target their marketing efforts more effectively, enhance their branding, engage with

prospective students in new ways, and make data-driven decisions to improve their marketing efforts;

- Digital financial services: provides higher education institutions with enhanced efficiency, security, transparency, accessibility, and cost savings in their digital finance operations;
- M-commerce: provides increased access, enhanced communication, improved learning experiences, increased efficiency, and improved accessibility to educational resources and services;
- Data collection systems: provides improved decision-making, enhanced accountability, personalized learning, improved student support, and a culture of continuous improvement;
- Supply chain management in e-commerce: supports cost savings, improved efficiency, enhanced sustainability, increased collaboration, and improved service delivery

The advantages of an e-commerce approach for the higher education institutions include:

- Direct contact with the end-customer, in this case the student, own customer data (student online behavior data) that can lead to customer intelligence allowing the institution to attract and engage with new customers (students);
- No need to share margins with any other entity;
- The ability to quickly launch new campaigns and gather new data, regarding products and services (alumni goods, tax payment, bookstores, fundraising etc.);
- The option to target new customers (students) using online marketing, as well as analytics tools to help understand students' needs better;
- Personalized product recommendation based on the user's location, behavior, purchase or browsing history;
- Speed, agility, flexibility and scalability thanks to disruptive technologies in e-commerce such as Artificial Intelligence (with AI based algorithms capable of predicting user behavior, along with the capability of triggering events based on data analysis and findings), Chatbots (also known as Conversational AI, the most advanced ones are already capable of answering open-ended questions in a human way), Machine Learning (systems learning and growing based on experience, in this case capable of running targeted campaigns to attract students, capable of automatic price adjustment in a manner which maximizes profits for the institution and avoids discouraging students from purchasing products or services);

- Cost effective, powerful and flexible, open always, easier to scale up, wider customer database.

Inclusive and equitable quality education (without restrictions of time and location), along with lifelong learning opportunities for everyone are top priorities for the United Nations Sustainable Development Goal 4 (SDG4) [5].

The COVID-19 pandemic highlighted the great importance of resilient infrastructure and technological innovation in building back better. A good example of the importance of technological innovation is the success in performing better and recovering faster of the of higher technology industries, proving to be far more resilient in times of crises than their low technology competitors [6].

To succeed in e-commerce, higher education institutions can take several steps as follows:

- Develop a clear e-commerce strategy: a clear plan with intentions regarding the use of e-commerce to achieve goals, and ensure that this plan is aligned with the overall mission and vision;
- Invest in digital infrastructure: invest in the latest digital infrastructure, including online platforms, payment systems, and digital marketing tools;
- Provide personalized experiences: use data analytics and other latest digital technologies to provide personalized experiences to students, tailoring offerings and services to individual needs and preferences;
- Focus on mobile: ensure that e-commerce offerings are optimized for mobile platforms, making it easy for users to access information and services;
- Emphasize security: protect sensitive data and ensure that the e-commerce offerings are secure and compliant with relevant regulations and standards;
- Prioritize user experience: focus on providing a seamless and enjoyable user experience, making it easy for students to find what they need and complete transactions quickly and efficiently.

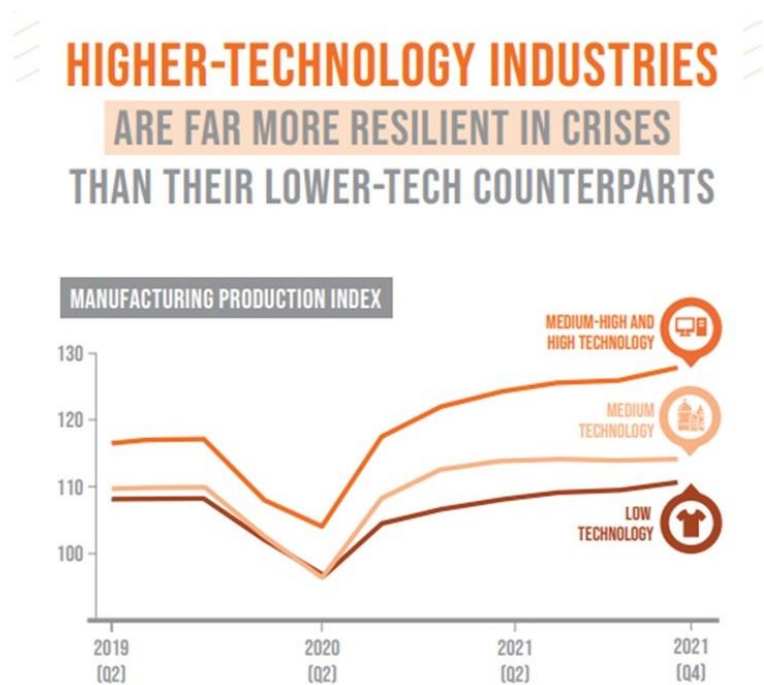


Fig. 6. Higher-technology industries are far more resilient in crises than their lower-tech counterparts.⁷

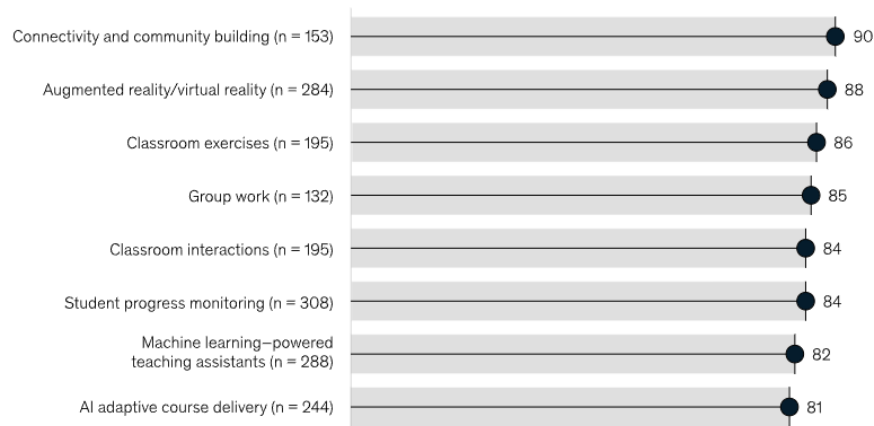
On July 6, 2022, the “Higher Education Sustainability Initiative” (HESI) organized a global forum to the “High-level Political Forum on Sustainable Development” (HLPF) to call attention to the essential role of higher education in achieving sustainable development. The event provided the opportunity to concentrate on the challenges, as well as opportunities experienced by the higher education community in supporting efforts to build back better from the COVID-19 pandemic and advance full implementation of the “2030 Agenda for Sustainable Development” [7].

The COVID 19-pandemic had a significant impact on the e-commerce sector, the internet spending jumped in 2020 from 23% to 36% of all retail sales and the big winners were those quick to adopt to new technologies [8], consistent in fulfilling customer expectations and requirements, continuously improving overall customer experience and fostering loyalty through proactive agile digital strategies.

⁷ Retrieved from: <https://unstats.un.org/sdgs/report/2022/The-Sustainable-Development-Goals-Report-2022.pdf>

Faculty view learning tools as worth the time and effort it takes to deploy them.

Perceived return on investment of learning technologies, by type,¹ % of respondents who agree



¹Question: This technology was a good investment of time and effort relative to the value it provides (select "Agree," "Disagree," or "Indifferent").
Source: Nov 2021 McKinsey survey of 634 faculty members and 818 students from public, private, and minority-serving colleges and universities

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Fig. 7. Perceived return on investment of learning technologies⁸

According to McKinsey & Company, 81% or more of faculty embrace learning technology tools such as *AI adaptive course delivery*, *Machine learning-powered teaching assistants*, *Student progress monitoring*, *Classroom interactions*, *Group work*, *Classroom exercises*, *Augmented reality/virtual reality*, *Connectivity and community building*, and support the idea of them being a good investment of effort and time to the value they provide (Fig. 6).

Disruptive technologies have the great potential to act as a bridge between e-commerce and higher education by enabling institutions to create innovative, personalized, and accessible learning experiences that meet the needs of students.

Also, disruptive technologies enable institutions to create online learning environments that are both engaging and interactive. Technologies such as virtual and augmented reality, gamification, and social media can be used to create immersive learning experiences that capture students' attention and make learning more enjoyable, while providing institutions with new opportunities.

⁸ Retrieved from: <https://www.mckinsey.com/industries/education/our-insights/how-technology-is-shaping-learning-in-higher-education>

4. Conclusions

1. Higher education institutions continue to be disrupted and must embrace digital transformation to overcome barriers and accelerate the adoption of disruptive technologies, operate flexibly and resiliently, strategize and implement the digital change in order to meet the evolving expectations of students and the needs of the faculties.
2. The digital transition of higher education is in progress, leaders need to have a comprehensive approach of the context to act quickly to use this opportunity to increase student retention, enrollment and engagement, build digital capabilities, and increase the agility of creating, implementing and adjusting the winning digital strategy ahead of competition.
3. Disruptive technologies have dramatically changed the way higher education institutions reach and engage with prospective students, manage the transition to a more resilient future, and how the full potential is reached by expanding opportunities through new innovative business models.
4. E-commerce occurs at both university and student's convenience, with actionable insights for decisioning and no space-time barriers, targeting strategic growth and offering the ideal digital environment to engage, deliver and measure, along with hyper-personalized data driven journey experiences for students.
5. Digital transformation strategies for higher education have the potential to unlock digital value and improve access to education, as well as operational efficiency, increase student engagement and retention, deliver meaningful value to students as a result of better understanding behavior and preferences with the help of AI and data analytics.
6. By adopting innovative personalized digital learning models, and incorporating immersive technologies for greater learning experiences, higher education institutions can provide students with the knowledge and skills they need to succeed in a rapidly changing digital world, while remaining competitive in an ever-changing landscape.
7. The use of disruptive technologies in e-commerce for higher education supports institutions in becoming more flexible and accessible, expand their reach, while taking the opportunity and transform the delivery and structure of online courses, offer more interactive and engaging digital learning experiences, fostering higher engagement and retention rates among students, as well as streamlining administrative processes. Therefore, the integration of disruptive technologies in e-commerce is a critical aspect for higher education institutions in order to remain competitive and become more relevant in the rapidly evolving digital landscape.

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