



# **ECAR Study of Community College Students and Information Technology, 2019**

## Contents

Introduction	3
Key Findings	5
Overview	6
Device Access, Ownership, and Importance	8
Student Success Tools	12
Learning Environment Preferences	14
Accessibility	16
Conclusion	18
Recommendations	19
Methodology	21
Acknowledgments	22
Appendix: Participating Institutions	23



### Author

Dana C. Gierdowski, EDUCAUSE

### Citation

Gierdowski, Dana C. *ECAR Study of Community College Students and Information Technology, 2019*. Research report. Louisville, CO: ECAR, May 2019.

©2019 EDUCAUSE. [Creative Commons BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/).

**EDUCAUSE**

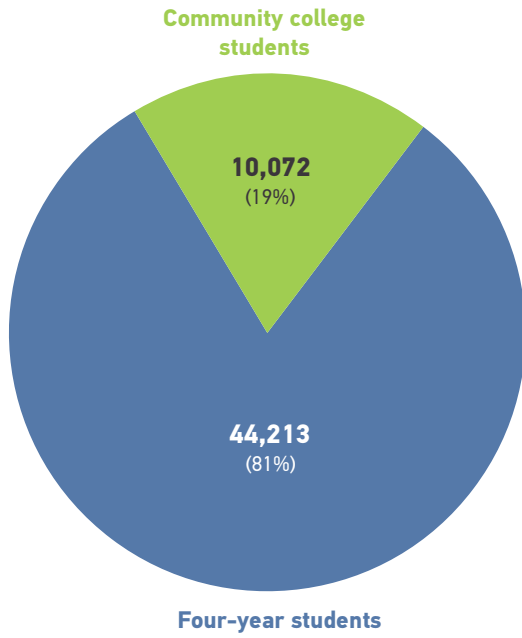
EDUCAUSE is a nonprofit association and the foremost community of IT leaders and professionals committed to advancing higher education. EDUCAUSE programs and services are focused on analysis, advocacy, community building, professional development, and knowledge creation because IT plays a transformative role in higher education. EDUCAUSE supports those who lead, manage, and use information technology through a comprehensive range of resources and activities. For more information, visit [educause.edu](https://educause.edu).

## Introduction

Each year since 2004, the EDUCAUSE Center for Analysis and Research (ECAR) has conducted a study of undergraduate students and information technology (IT) with the goal of better understanding how students are using technology and the role it plays in their academic success. Thousands of students participate annually from more than one hundred institutions, and the results offer us the opportunity to examine student perspectives from colleges and universities big and small, public and private. While studying institutions in the aggregate offers a landscape view of students' experiences with IT, it also demonstrates that institutional contexts—such as size, type, and student characteristics—can affect technology experiences. This is especially true for community colleges, where more than a third (35% in 2017) of the more than 17 million undergraduates enrolled in Title IV institutions attend.<sup>1</sup> Community colleges have a history of serving more diverse populations than other institutions, and with the high cost of four-year college tuition<sup>2</sup> they provide access to an affordable education for many students. Due to the variety of people they serve and the impact these colleges have in their communities, it is important to study the perspectives of students at two-year and AA colleges. ECAR last studied student experiences through a community college lens in 2007, which in technology years is a lifetime; much has changed, and an updated report on community colleges is well overdue. This report highlights the ways community college students use, learn, and benefit from technology with regard to:

- Key demographics of the community college students in this study
- Device access, ownership, and importance to academic success
- Student success tools
- Learning environment preferences
- Accessibility

Of the 54,285 US responses included in the 2018 student study, 10,072 responses (19%) were from students from 40 community colleges<sup>3</sup> (figure 1). Responses were analyzed to better understand their technology experiences based on key demographic factors and how some of those experiences compared with those of their peers at other types of institutions. The results summarized in this report can be used to identify and examine ways stakeholders might leverage technology to address the unique needs of community college attendees. Recognizing and attending to the varying circumstances of two-year and AA students can reveal opportunities to increase retention and credential completion, whether students stay at their community college or transfer to a four-year institution. Readers who apply these results should address the specific context of each institution based on its student population, structure, vision, and culture.



**Figure 1. Breakdown of respondents by two-year and four-year institutions**



## Key Findings

- **Community college students are juggling more responsibilities than their four-year peers.** They are older, more often employed, and twice as likely to be married or in a domestic partnership. The majority of community college students are financially independent, and they are more likely to have dependents of their own. More women than men at community colleges reported living on their own and having dependents.
- **Nearly all community college students own smartphones and laptop computers, and more own desktop computers than students at other institutions.** A very small percentage of community college students have access to AR/VR headsets and 3D printers; of those who do have access, more own them versus depending on their campus to provide them. Despite this limited access, more community college students than four-year students rated AR/VR headsets and 3D printers as very or extremely important to their academic success. The majority of these students were health science majors.
- **Although community college students find online student success tools useful, fewer are aware of degree planning and mapping tools than four-year (non-community college) students.** More than a third reported they either don't have access to or aren't aware of the tools. Significantly more minority than white students at community colleges rated early-alert systems and tools that suggest how to improve course performance as very/extremely useful.
- **Community college students who are women, those who work, students who are married or in a domestic partnership, and those with dependents are all more likely to prefer learning environments that are mostly or completely online.** This preference is likely due to the demands of balancing work schedules, family responsibilities, and academics. Around half of community college students prefer blended learning environments, but they are also twice as likely as four-year students to prefer courses that are completely online.
- **Two-year and AA colleges are doing a significantly better job than other institutions of meeting the needs of students with disabilities who require technology for their academics.** More than half of community college students with disabilities who need accessible or adaptive technology reported their college's awareness and support of their needs as good or excellent.

## Overview

The community college students in our sample are similar to their peers at other degree-granting institutions in a few demographic categories. The gender distribution at community colleges is nearly the same,<sup>4</sup> with 33% of respondents identifying as male, 67% identifying as female, and 29% of students at both community colleges and four-year institutions reporting they were first-generation college students. The ethnic distribution in community colleges for Asian and black students (both at 7%) and those identifying as another ethnicity (9%) is also similar to that of other institutions;<sup>5</sup> more community college students identified as white (70% compared with 56%), and fewer students identified as Hispanic (8% compared with 19%). However, it is important to note that our sample of community college students is not representative. National statistics tell us that more Hispanic (25%) and black (13%) students and fewer white students (46%) attend two-year and AA degree-granting colleges.<sup>6</sup> In our study, community colleges in the upper Midwest region have greater representation than those in other areas of the United States<sup>7</sup> that are more ethnically diverse.

Our findings indicate that community college students are older and have more responsibilities than their four-year institution peers, as we saw statistically significant differences when we examined their work and household situations. Three quarters (78%) of our sample of all students are between the ages of 18 and 24 (82% among non-community college and 58% among community college respondents), but community college attendees are older than four-year students by about four years, with a mean age of 27.<sup>8</sup> Our data also suggest that community college students are more likely to be economically disadvantaged, with 66% reporting they were eligible for Pell grants, compared with 57% for students who attend other schools. Sixty-one percent of community college students are enrolled full time,<sup>9</sup> a significantly smaller percentage than for undergraduates at schools in the other Carnegie classes (87%).

More community college respondents told us that they are employed and that they work more hours than their counterparts, with 82% reporting they held jobs (including hourly work-study) while taking classes, compared with 66% of four-year students. A majority (55%) of both student groups who are enrolled full time reported that they work part time (fewer than 30 hours per week); however, two-year and AA students are more likely to have full-time jobs. Among those students enrolled full time at two-year schools, 24% are employed full time (30 or more hours per week), which is a significantly greater percentage

than that of their peers at other institutions (see figure 2). The largest share (64%) of community college respondents are independent (with and without dependents), compared with their four-year peers; nearly three times as many are independent with dependents of their own (28%); and twice as many are married or in a domestic partnership (28%) as their four-year peers. Within community colleges, more females (32%) than males (22%) reported being independent with dependents. Females with dependents at community colleges are likely single mothers, as data from the Institute for Women’s Policy Research show that a plurality of single mothers (44%) are enrolled in public two-year institutions.<sup>10</sup>

Community college students		Four-year students
<b>82%</b>	Hold jobs while taking classes	<b>66%</b>
<b>24%</b>	Enrolled full time and work full time*	<b>10%</b>
<b>36%</b>	Dependent	<b>66%</b>
<b>36%</b>	Independent without dependents	<b>23%</b>
<b>28%</b>	Independent with dependents	<b>10%</b>
<b>28%</b>	Married or in a domestic partnership	<b>13%</b>

\*at least 30 hours per week

**Figure 2. Comparisons between community college students and their four-year college peers**

## Device Access, Ownership, and Importance

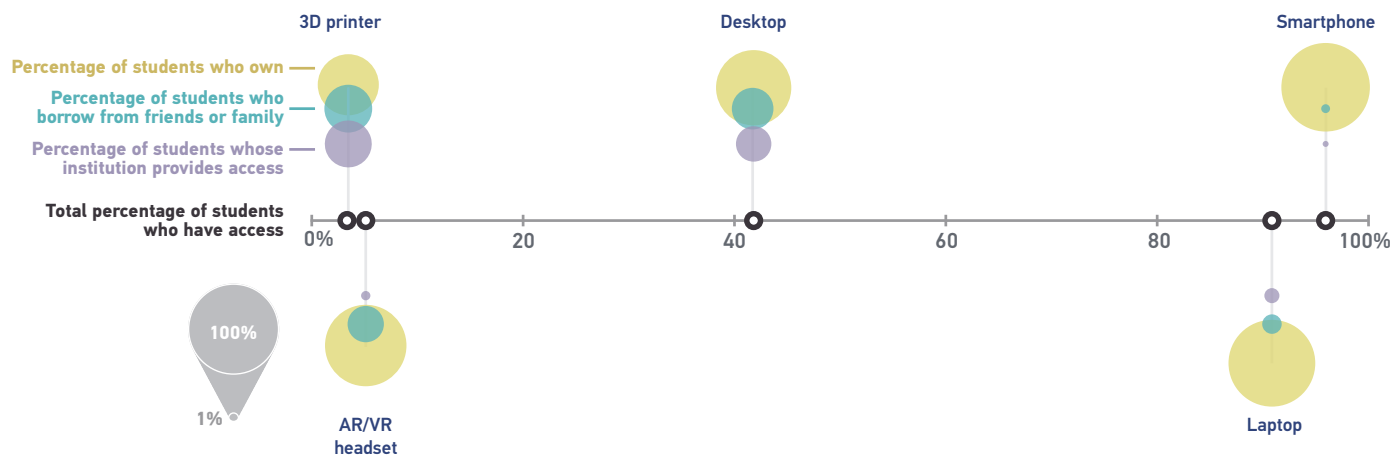
Our finding that more community college students work and take care of families may also help us understand what they told us about the devices they use for their academics. As noted in EDUCAUSE's 2018 student study, we improved our inquiry process regarding student device ownership to be more in line with principles of equitable access. To avoid socioeconomic bias, we asked first if students had access to a variety of technologies, and then asked how they access those devices (personally owned, borrowed from friends/family, or provided by their campus). Although the percentages of community college and non-community college students who said they own smartphones and laptops are identical, or nearly so (nearly all own),<sup>11</sup> our results indicate some differences in ownership of other technologies. Of those community college students who have access to desktop computers (42%, compared with 34% among non-community college students), more reported *owning* these devices (73%) compared with their peers at four-year colleges and universities (60%).

The vast majority of students in both groups (over 90%) said laptops are very or extremely important for their coursework; however, slightly fewer community college respondents (85% versus 91%) reported using laptops for all or most of their courses. This slight difference could be attributed to several factors. Not surprisingly, nearly all (97%) two-year and AA students live off campus, so they may use a desktop computer that already exists in their household, in addition to using a personal laptop.<sup>12</sup> Students in the STEM fields, particularly those in computer and information sciences, reported higher percentages of desktop ownership than did other majors, which may suggest these students either want or require devices with more computing power (e.g., for personal gaming, specialty software for coursework, or more storage to meet their household's needs). And having access to those devices at home may be convenient or even necessary due to work schedules and family responsibilities.

Our results indicate that the number of students who have access to newer technologies, specifically AR/VR headsets and 3D printers, is very small and essentially the same for community college and four-year students (figure 3). A mere 5% of community college students and 4% of their four-year peers reported having access to AR/VR headsets, and only 3% in each group said they had access to 3D printers. However, community college students in our sample access these technologies in different ways. Of the few two-year and AA students who have access, the majority (84%, compared with 71% among non-community college students with access) personally own AR/VR headsets,<sup>13</sup> while only 2% said these devices were provided by or on loan from their college (compared with 9% among students at other institutions). The majority of the community college students who own AR/VR headsets also own gaming systems, so students



may be using these technologies together for entertainment purposes. Access to 3D printers via personal ownership was also higher for community college students (47%) compared with students at other types of institutions (27%). This was a surprising finding, given that community college students tend to be economically disadvantaged compared to their peers at four-year colleges,<sup>14</sup> and 3D printers can be expensive. Our data suggest that 3D printers are not as accessible on the community college campuses in this sample as at other types of institutions; fewer than a third of community college students with access to 3D printers (28%) said they were provided by their school, while the majority (60%) of their four-year counterparts reported they accessed these at their institution. Generally, there were no significant differences in access to either AR/VR or 3D printers by ethnicity between community college students or among four-year students, but we did observe that significantly more nonwhite than white students reported owning 3D printers in both groups.



**Figure 3. Community college student device access and ownership**

Although fewer students at community colleges reported that their campus provided AR/VR headsets and 3D printers, these devices appear to be having an impact on students. More community college students rated AR/VR headsets (30% among students who use them for academic work) as very or extremely important to their academic success than did students at other schools (23%). And 3D printers seem to be even more valuable to community college students, with 55% of those who use them for academic work rating them very or extremely important, compared with 41% among students at other institutions. The percentages of community college and non-community college students who reported using mainstream technologies (e.g., laptops, desktops, hybrids, tablets,

smartphones) for most or all of their courses were the same or similar; however, community college students who use 3D printers for academic work more often reported using them in most or all of their courses (24%, compared with 12% among students at four-year institutions).

The growth of certificate and degree programs in the area of additive manufacturing, where coursework focuses on 3D digital design and manufacturing technologies,<sup>15</sup> is one possible explanation for the high value placed on 3D printing at two-year and AA institutions. In an effort to address an increasing skills gap in the manufacturing workforce, initiatives such as America Makes, “Creating Connections in Manufacturing Communities with Community Colleges,” and the “Community College Advanced Manufacturing Career Pathways” are supporting industry and community college partnerships to train future employees; as a result, more community colleges are making 3D printing the centerpiece of design courses.<sup>16</sup>

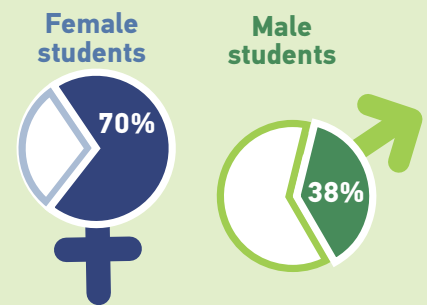
The fields and disciplines students at community colleges are majoring in may shed some light on the differences in their use of and regard for 3D printing technologies. A plurality (28%) of the two-year and AA students in this study are majoring in health sciences, including professional programs; this is significantly more than students at other institution types (16%). Eighty-four percent of 3D printer users studying health sciences rated them as very or extremely important to their academic success, which suggests health science programs may be incorporating this technology into their curricula, or students are seeking out 3D printers as a supplement to their instruction. IT professionals at community colleges are recognizing the importance of these bleeding-edge devices as well. In a 2018 EDUCAUSE survey on extended reality (XR) technologies, most respondents at AA institutions rated the potential value of augmented reality (AR) and virtual reality (VR) technology as high (86% and 87%, respectively) in the fields of medicine and health.

Making this technology more accessible on community college campuses could help prepare students for positions and careers in health care, where labor shortages are being reported.<sup>17</sup> The demand for professionals in allied health care (e.g., medical assistants, occupational therapists, pharmacy technicians, dental hygienists, surgical technologists, laboratory technicians) is also expected to impact rural parts of the United States substantially.<sup>18</sup> Research has shown that community colleges play a critical part in educating and training residents and workers in nonurban areas in the health sciences. For example, a Rural Health Research Center study found that the majority of individuals who finished allied health programs for occupations that are most commonly available in rural areas did their coursework at community colleges.<sup>19</sup> Another study revealed that 75% of registered nurses working in rural areas obtained their foundational training in associate degree and/or certification programs.<sup>20</sup>

Regardless of geography, though, two-year and AA schools are providing opportunities for health science students to build skills that can translate to immediate and local employment, and these advanced technologies can aid in their preparation. Some community colleges are already leveraging the power of these technologies, from using VR programs to develop their clinical and empathy skills<sup>21</sup> to 3D printing assistive devices for individuals with disabilities.<sup>22</sup> Using VR for patient simulations is especially useful in helping students strengthen their skills, as it allows for the repetition of hands-on experiences (such as practicing in emergency medical situations or diagnosing rare conditions).<sup>23</sup> With this in mind, providing greater access to 3D printers and other next-gen tech such as AR/VR headsets can help future practitioners train in safe environments with simulated tools and equipment.<sup>24</sup> Specific recommendations for deploying a campus 3D technology initiative are outlined in the 2018 Learning in Three Dimensions: Report on the EDUCAUSE/HP Campus of the Future Project. Allocating money, staff, and time to its development and implementation is the first step.

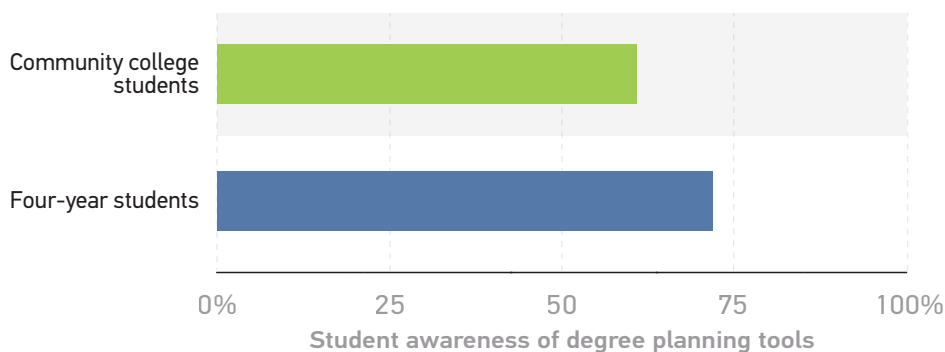
### Females, 3D Printers, and Majors

Almost twice as many female as male community college students said 3D printers were very or extremely important to their academic success. Women who rated 3D printers highly were more likely to be health sciences, including professional programs, and engineering and architecture majors.



## Student Success Tools

Both community college respondents and their four-year counterparts shared similar views about the usefulness of the online student success tools provided by their institution, with only slight differences observed. Overall, both groups told us that tools that aid them in the business of being students (e.g., degree planning/mapping, degree audit, and self-service systems for registration, tracking credits, transfers, and dual enrollments) were more useful than those that help them with their academic success (such as early-alert systems and tools that suggest how to improve in a course). However, significantly fewer two-year and AA students reported that degree planning and mapping tools (those that identify courses needed to complete degrees) were provided by their school. Only 61% of community college students said they knew that online degree planning tools were available to them, compared with 72% of those at four-year institutions (figure 4). This suggests that more than a third of two-year and AA respondents either aren't aware of or don't have access to such resources. And these are tools that could have a positive impact on their academic success. Among the community college students who said degree planning/mapping tools were provided, nearly two-thirds (65%) said they were very or extremely useful.



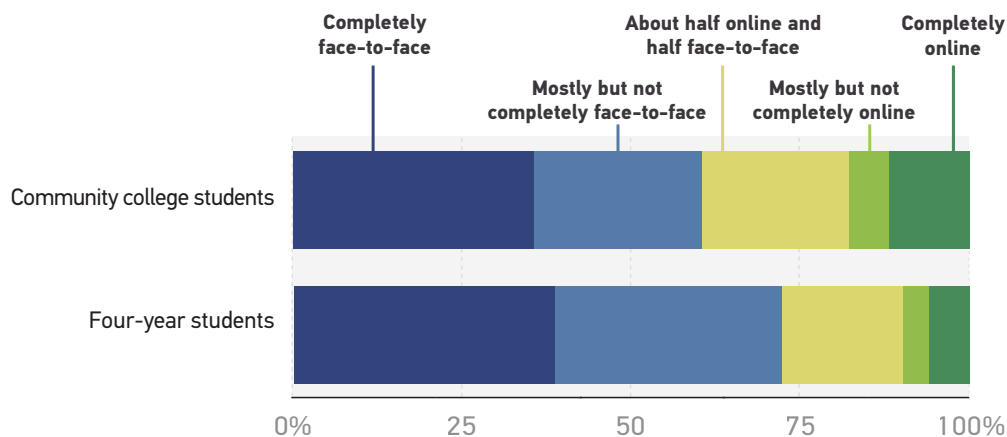
**Figure 4. Student awareness of online degree planning tools, by institution type**

Online success tools can help students identify courses needed to complete their programs, save students and advisors time, reduce errors, and increase graduation and credential completion rates.<sup>25</sup> Integrated Planning and Advising for Student Success (iPASS) initiatives also have the potential to improve success rates, especially for students who may be unprepared for college-level work.<sup>26</sup> Similar to our findings in the 2018 student study, online success tools are valued by students from underrepresented groups who have access to such tools. Significantly more minority than white students at community colleges rated many success tools as very/extremely useful, including early-alert systems, tools that offer guidance about courses to take in the future, and tools that suggest how to improve course performance. For community colleges that are using these kinds of tools, this is good news, especially when we consider that more minority students attend two-year and AA degree-granting colleges than four-year institutions. IT professionals at community colleges are also recognizing the importance of these tools. AA institutions rated “technologies for planning and mapping student educational plans” and “integrated student success planning and advising systems” No. 2 and No. 4, respectively, in the Top 10 strategic technologies for 2019. Results from this study indicate that AA colleges are devoting attention to planning and expanding these technologies on their campuses. Online success tools can be part of a tech arsenal that works to combat the racial and ethnic disparities in existing credential completion rates.<sup>27</sup> But to maximize these benefits, students must be aware of online success tools and know how to use them, so promotion of these resources through faculty and student training is critical.



## Learning Environment Preferences

Since a larger proportion of community college students work full time, live on their own, and have family responsibilities, it’s no surprise that more (69%) say they have taken online courses in the past 12 months than students at four-year institutions (54%). Around half of all students in both groups favor blended courses; however, two-year and AA students are also twice as likely to prefer environments that are completely online (12%, versus 6% of non–community college students) (figure 5). We also found some differences when we controlled for a few key demographic factors among the community college group. Women, students who work, people who are married or in a domestic partnership, and students who have dependents are all more likely to prefer learning environments that are mostly or completely online.



**Figure 5. Student learning environment preferences, by institution type**

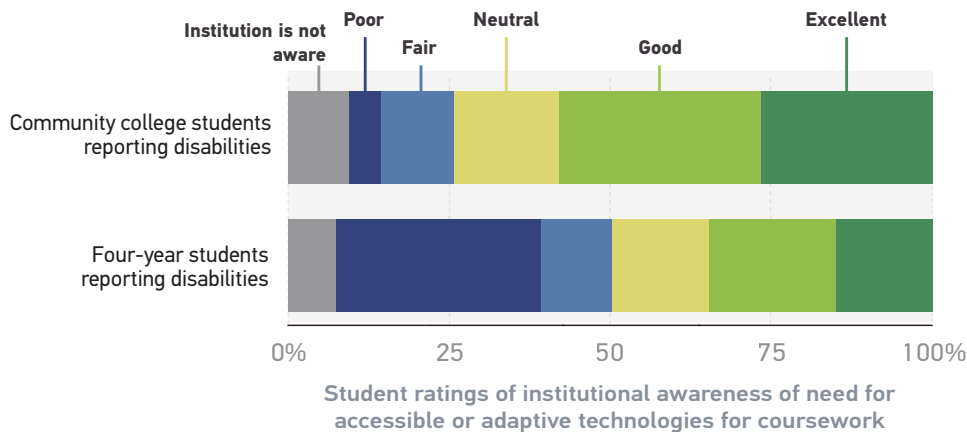
Our analysis from the 2018 student study revealed that the most significant predictor of learning environment preference was the respondent’s most recent experience,<sup>28</sup> and this seems to hold true for community college students as well. It stands to reason that they would gravitate toward environments that are both familiar and recent. However, other factors are at play in the lives of community college students. The higher preference for courses that are mostly or completely online may be pragmatic or a matter of necessity to help them balance the demands of work, family, and education. For example, research on community

college students' choices between online and face-to-face courses indicates that work schedules (e.g., long hours and overnight and/or irregular shifts), childcare responsibilities, and transportation issues (long distances to campus, not owning a car, and the expense of fuel) were circumstances that influenced their selection.<sup>29</sup>

Some research has indicated that community college students do not perform as well in online-only courses;<sup>30</sup> however, other studies have revealed a paradox: that while students may not perform as well at the course level, those who took some of their courses online were more likely to complete an associate's degree or credential or transfer to a four-year institution.<sup>31</sup> Research on hybrid courses has shown that community college students do just as well in blended environments as they do in face-to-face courses.<sup>32</sup> With these data in mind, offering more blended and online courses might help community college students stay on the path toward finishing their degrees or programs as they juggle the time it takes to study, work, and care for their families. But offering additional courses of these types should be coupled with student support. As noted in the 2018 undergraduate study, informing students about the benefits, expectations, and demands of blended and online courses gives them the tools to make decisions about the learning environments that best suit their needs. For example, research on mandatory orientations for community college students enrolled in online courses has shown that increased success rates and lower withdrawal rates result.<sup>33</sup> Implementing early-alert systems and promoting their use among faculty who teach online and blended courses also offers community colleges a way to track students who are struggling academically, allowing for earlier interventions.

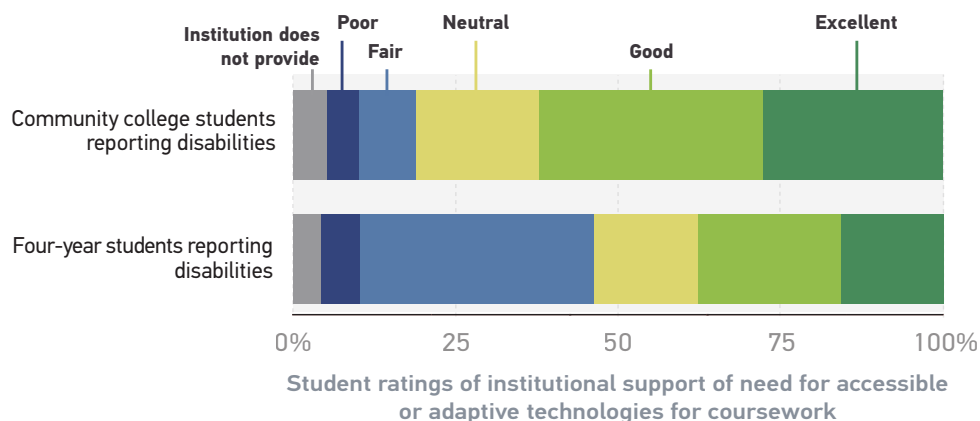
## Accessibility

We reported our findings regarding the technology experiences of students with disabilities for the first time in the 2018 student study to raise awareness of issues related to diversity, equity, and inclusion (DEI) in higher education IT. When we analyzed the data from community college students, it was clear: two-year and AA colleges are doing a significantly better job than other institutions of meeting the needs of students with disabilities who require accessible or adaptable technology for their academics. And the differences are striking. Of the 8% of community college students who identified as having a physical, learning, or both a physical and a learning disability, the majority (58%) reported their college's awareness of their needs as good or excellent (figure 6), and only 5% rated awareness as poor.



**Figure 6. Awareness of student accessibility needs, by institution type**

In stark contrast, at four-year institutions, good and excellent awareness ratings were significantly lower (35%) and about a third of students said awareness was poor. Students with disabilities at two-year and AA colleges also told us that their institutions are doing a better job of supporting their technology needs, as 63% rated their support positively. Ratings of fair given by community college respondents were also significantly lower (9%) than the fair ratings of their four-year college peers (36%) (figure 7).



**Figure 7. Support for accessible and adaptive technologies, by institution type**

Why might community college students give their institutions higher marks? Their experiences may be related to the fact that community colleges have historically served more diverse populations. National research tells us that more students with disabilities are enrolled at community colleges.<sup>34</sup> According to the National Center for Education Statistics, of the undergraduate students with disabilities who were enrolled in postsecondary institutions, about half attended public two-year institutions.<sup>35</sup> Since most community colleges have open admissions policies, students with disabilities may find them more welcoming. As a result of these larger enrollments, community colleges may have more experience serving this population and can be more responsive to their needs. Moreover, many community colleges offer transition programs that help students bridge the gap between high school and college; these programs also help them develop self-advocacy skills that can be applied when they transfer to four-year schools or join the workforce.<sup>36</sup>

## Conclusion

The findings in this report reflect the unique situations of community college students and the responsibilities they shoulder in the management of their academic, family, and work lives. While ownership of a personal device is now ubiquitous, emerging technologies are having an impact on the few who have access to them on their campuses. This report provides insights into why newer technologies are valued by students pursuing particular fields and programs; 3D technologies are potential game-changers in addressing industry shifts and their associated skill gaps by helping prepare people for positions needing to be filled across the United States that will impact human health outcomes. Student demographics play an important role in understanding the lives of two-year and AA students and how technology can be leveraged further to encourage success and credential completion. These findings also reveal that the learning environment preferences of this population are influenced by the obligations they have outside the college classroom.

We hope this study encourages important conversations among community college stakeholders about the ways technology can be used to address the needs of students in underrepresented groups, thereby fostering more equitable and inclusive campuses. These results are also useful for the many IT professionals, faculty, and administrators at other institution types who work with students who transfer from two-year and AA schools. While this report offers insights and possible explanations about why these patterns exist among this population of community college students, more research is needed to gain a greater understanding of the experiences of minority students and those from regions not represented in this study. With additional and more representative data, we would have the opportunity to capture a more focused picture of their technology needs, preferences, and social contexts.



## Recommendations

- **Deploy the ECAR student surveys on more community college campuses.** Several US regions were underrepresented; the New England and Rocky Mountain states, as well as the outlying areas/US territories, were not represented at all in the 2018 survey results. Given the large number of students—many from underrepresented populations—who attend two-year and AA institutions, the role these institutions play is vital in providing access to an affordable education. Broader participation in ECAR surveys would allow for greater understanding of these students’ technology experiences and enable EDUCAUSE to better serve the unique needs of these two-year and AA institutions, and their students.
- **Increase investment in and access to newer technologies such as AR/VR headsets and 3D printers.** Compared with their four-year peers, fewer community college students have access to these technologies on their campuses, and increasing access can help avoid the creation of a new digital divide. Due to the large number of women and minority students they serve, community colleges can position themselves as leaders in access to and implementation of next-gen technologies to promote diversity, equity, and inclusion. Allocate a budget to these devices and offer faculty support in their implementation. Locate 3D technologies in common spaces on campus (e.g., libraries, makerspaces, media studios) to increase access and encourage student engagement.
- **Increase the awareness and use of student success tools when available, especially those related to degree planning and mapping.** Online success tools can contribute to a student’s academic performance, and these are especially valued by minority students who have access to them. Train students, faculty, and advisors to effectively use these tools, and increase their visibility through online campus marketing, student orientations, and advisement sessions.
- **Couple more opportunities to take blended and online courses with student support initiatives.** IT can partner with other campus units to educate students about the demands and possibilities of online environments so that they can make informed decisions about the learning environments that work best for them. Train faculty who teach blended and online courses to effectively use early-alert and other online student success tools and encourage their use.

- **Partner across campus units to continue increasing awareness to meet the needs of students with disabilities who require assistive/adaptive technologies.** Foster an inclusive mind-set and use language that communicates *accessibility* in student resources to maintain an open and productive dialogue with students so that they are comfortable disclosing their needs. Work proactively with disability services and support the adoption of universal design for learning principles for tech across campus.

## Methodology

In 2018, ECAR conducted its latest annual study of undergraduate students and information technology to shed light on how IT affects the college/university experience. These studies have relied on students recruited from the enrollment of institutions that volunteer to participate in the project. After institutions secured local approval to participate in the 2018 study (e.g., successfully navigating the IRB process) and submitted sampling plan information, they received a link to the current year's survey. An institutional representative then sent the survey link to students in the institution's sample. Data were collected between February 5 and April 23, 2018, and 64,536 students from 130 institutional sites responded to the survey. ECAR issued \$50 or \$100 Amazon.com gift cards to 39 randomly selected student respondents who opted in to an opportunity drawing offered as an incentive to participate in the survey. Colleges and universities use data from the EDUCAUSE Technology Research in the Academic Community (ETRAC) student and faculty surveys to develop and support their strategic objectives for educational technology. With ETRAC data, institutions can understand and benchmark what students and faculty need and expect from technology. There is no cost to participate. Campuses will have access to all research publications, the aggregate-level summary/benchmarking report, and the institution's raw (anonymous) response data.

The quantitative findings in this report were developed using 54,285 survey responses from 114 US institutions. Responses were neither sampled nor weighted. Comparisons by student type and institution type are included in the findings when there are meaningful differences, and all statements of significance are at the .001 level unless otherwise noted. Findings from past ECAR studies were also included, where applicable, to characterize longitudinal trends.

For the purposes of this study, community colleges were defined as institutions that (1) have the Carnegie class of AA and (2) are two-year institutions. In this study, two institutions met one or the other, but not both, of those criteria; they were included after verifying their community college status. Forty ETRAC-participating institutions were classified as community colleges, providing 10,072 community college students (19% of US respondents) for our sample.

## Acknowledgments

The EDUCAUSE Center for Analysis and Research (ECAR) would like to first thank the community college students who took time from their schedules to participate in the 2018 ETRAC student survey, from which these data were derived. Thanks are also in order to the survey administrators at the participating two-year and AA institutions who planned and deployed the survey to the students on their campuses. We also thank our community college subject-matter experts, Richard A. Sebastian, Director, OER Degree Initiative at Achieving the Dream Inc., and Michael Chahino, EdD, Chief Information Officer at Elgin Community College, who offered their time and expertise in reviewing this study. Their thoughtful feedback and suggestions have greatly improved the quality of the report.

Many thanks go out to the team of EDUCAUSE staff who made significant contributions to this report. First, a special note of appreciation to D. Christopher Brooks for his guidance and leadership on this project, from the first round of data analysis to the final draft. Thanks to Ben Shulman for his thorough statistical review that ensured the data analysis was accurate and the explanations fitting. Thanks also go to Kate Roesch for designing the engaging figures that helped bring the data to life, and to Joseph D. Galanek for his helping hands in early-stage manuscript review. We are thankful for Gregory Dobbin and the publications team for their attention to detail and editorial guidance, and for Lisa Gesner for her skilled content management and marketing of this project. Finally, thank you to Susan Grajek and Mark McCormack for their review of the manuscript and suggestions for making it stronger, as well as their enthusiasm and support of this project along the way.

## Appendix: Participating Institutions

Alexandria Technical & Community College  
Anoka-Ramsey Community College  
Anoka Technical College  
Broward College  
Central Lakes College-Brainerd  
Century College  
Cleveland State Community College  
Collin County Community College District  
County College of Morris  
Dakota County Technical College  
Evergreen Valley College  
Fond du Lac Tribal and Community College  
Hennepin Technical College  
Hibbing Community College  
Inver Hills Community College  
Itasca Community College  
Joliet Junior College  
Lake Superior College  
Madison Area Technical College  
Mesabi Range College

Minneapolis Community and Technical College  
Minnesota State College Southeast  
Minnesota State Community and Technical College  
Minnesota West Community and Technical College  
Montgomery County Community College  
Normandale Community College  
North Hennepin Community College  
Northland Community and Technical College  
Northwest Technical College  
Pine Technical & Community College  
Rainy River Community College  
Ridgewater College  
Riverland Community College  
Rochester Community and Technical College  
Saint Paul College  
San Jose City College  
Sauk Valley Community College  
South Central College  
St. Cloud Technical and Community College  
Vermilion Community College



## Notes

1. S. A. Ginder, J. E. Kelly-Reidand, and F. B. Mann, “Enrollment and Employees in Postsecondary Institutions, Fall 2017; and Financial Statistics and Academic Libraries, Fiscal Year 2017: First Look (Provisional Data)” (NCES 2019- 021rev), US Department of Education (Washington, DC: National Center for Education Statistics, 2018).
2. According to data from the College Board, the average community college tuition is \$3,570, compared with \$9,970 at four-year colleges. See College Board, “Trends in College Pricing 2017.”
3. For the purposes of this study, community colleges were defined as institutions that (1) have the Carnegie class of AA and (2) are two-year institutions. In this study, two institutions met one or the other, but not both, of those criteria, but were included after verifying their community college status.
4. Among respondents at non–community colleges, 34% are male and 66% are female.
5. At four-year colleges and universities, 10% of respondents are Asian/Pacific Islander, 6% are Black/African American, and 10% identified as Other or multiple ethnicities.
6. American Association of Community Colleges, “Fast Facts 2019.”
7. Sixty-seven percent of community college participants came from institutions in the Plains States (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota). Other US regions represented included the Great Lakes at 12%, Mid-East at 10%, Southeast at 5%, Far West at 3%, and the Southwest at 3%. There was no participation from community colleges in the New England or Rocky Mountain states or in outlying areas/US territories.
8. The mean age from our sample is slightly younger than the mean age reported by the American Association of Community Colleges, which is 28 years. See AACC’s “Fast Facts 2018.”
9. Our data differ from analysis of NCES data done by the American Association of Community Colleges, which indicates that 63% of community college students are enrolled part time and 37% are enrolled full time. See AACC’s “Fast Facts 2019.”
10. Institute for Women’s Policy Research, “Single Mothers in College: Growing Enrollment, Financial Challenges, and the Benefits of Attainment,” briefing paper, September 2017.
11. Ninety-five percent of respondents have access to a smartphone (of whom 99% own them personally), and 91% have access to a laptop (of whom 97% own them personally).
12. Nearly all respondents reported owning at least two internet-capable devices.
13. Examples of AR/VR headsets provided in the survey ranged from the low to high end, and included Google Cardboard/Daydream, Google Glass, Oculus Rift, and Samsung Gear VR.
14. “Bridging the Higher Education Divide: Strengthening Community Colleges and Restoring the American Dream,” Century Foundation, New York, 2013.
15. “3D Digital Design and Manufacturing Technology,” Engineering Technology, Cuyahoga Community College; Lauren Mandery, “Additive Manufacturing Education Is Helping to Bridge the Workforce Development Gap,” Stratasys, June 18, 2018.
16. “Additive Manufacturing Can Provide Prototype of Skill Set Required to Be Competitive in Growing Job Market,” California Community Colleges, Programs to Watch.

17. Parija Kavilanz, "The US Can't Keep Up with Demand for Health Aides, Nurses and Doctors," *CNN Business*, May 4, 2018; Marisa Lifschutz, "Top Five Sectors Exposed to Labor Shortages in 2018," *Ibis World, Industry Insider*, July 12, 2018.
18. Elizabeth Burrows, Ryung Suh, and Danielle Hamann, "Health Care Workforce Distribution and Shortage Issues in Rural America," National Rural Health Association Policy Brief, January 2012.
19. S. M. Skillman, G. A. Keppel, D. G. Patterson, and M. P. Doescher, "The Contributions of Community Colleges to the Education of Allied Health Professionals in Rural Areas of the United States," WWAMI Rural Health Research Center, October 2012.
20. Roxanne Fulcher and Christopher M. Mullin, "A Data-Driven Examination of the Impact of Associate and Bachelor's Degree Programs on the Nation's Nursing Workforce," American Association of Community Colleges, Policy Brief 2011-02PBL, March 2011.
21. "Foundation Funds Virtual Reality Equipment for Empathy Training," Joliet Junior College, March 20, 2019; "Pearson and 3D4Medical Announce the Launch of World's First Anatomy App for Mixed Reality and HoloLens," Pearson, November 26, 2018.
22. "Ann Arbor Girl Gets New Hand Thanks to WCC's 3-D Printing Technology," *On the Record*, Washtenaw Community College, March 2017; Olivera Perkins, "Cuyahoga Community College Students Use 3D Printing to Make Assistive Devices for Veterans," *The Plain Dealer*, November 26, 2017.
23. Jeffrey Pomerantz, *Learning in Three Dimensions: Report on the EDUCAUSE/HP Campus of the Future Project*, research report (Louisville, CO: ECAR, August 2018).
24. Kenneth Michek, "Educators Turn to 3D Printing to Train Nursing Students," *HealthLeaders*, July 13, 2018.
25. Antonia Ceballos and Kathy James, "Redesigning Austin Community College: Transformation through Integrated Technology," *EDUCAUSE Review* 52, no. 6 (November/December 2017); Hoori Santikian Kalamkarian, Melissa Boynton, and Andrea G. Lopez, "Redesigning Advising with the Help of Technology: Early Experiences of Three Institutions," Community College Research Center, Teachers College, Columbia University, July 2018.
26. "7 Things You Should Know about IPAS," EDUCAUSE Learning Initiative.
27. D. Shapiro, A. Dunder, F. Huie, P. Wakhungu, X. Yuan, A. Nathan, and Y. A. Hwang, *Completing College: A National View of Student Attainment Rates by Race and Ethnicity – Fall 2010 Cohort* (Signature Report No. 12b) (Herndon, VA: National Student Clearinghouse Research Center, April 2017).
28. Joseph D. Galanek, Dana C. Gierdowski, and D. Christopher Brooks, *ECAR Study of Undergraduate Students and Information Technology, 2018*, research report (Louisville, CO: ECAR, October 2018).
29. Shanna Smith Jaggars, "Choosing Between Online and Face-to-Face Courses: Community College Student Voices," *American Journal of Distance Education* 28, no. 1 (2014): 27-38.
30. Shanna Smith Jaggars and Di Xu, "Online Learning in the Virginia Community College System," Community College Research Center, September 2010; Di Xu and Shanna Smith Jaggars, "Adaptability to Online Learning: Differences across Types of Students and Academic Subject Areas," Working Paper No. 54, Community College Research Center, February 2013.
31. Hans Johnson and Marisol Cuellar Mejia, "Online Learning and Student Outcomes in California's Community Colleges," Public Policy Institute of California, May 2014; Peter Shea and Temi Bidjerano, "Does Online Learning Impede Degree Completion? A National Study of Community College Students," *Computers & Education* 75 (2014): 103-111.

32. Corinne Crawford, Joel Barker, and Achraf Seyam, "The Promising Role of Hybrid Learning in Community Colleges: Looking towards the Future," *Contemporary Issues in Education Research* 7, no. 3 (3rd quarter, 2014).
33. See "Bay College (MI)" at "Eleven Colleges Recognized as Leader Colleges of Distinction," *Achieving the Dream*; "Success Online: Be a Successful Online Learner," Bay College.
34. "Students with Disabilities," *Data Points* 6, no. 13, American Association of Community Colleges, September 2018.
35. K. Raue and L. Lewis, "Students with Disabilities at Degree-Granting Postsecondary Institutions," US Department of Education, National Center for Education Statistics (Washington, DC: US Government Printing Office, 2011).
36. Grace Chen, "Students with Learning Disabilities Find Help in Community Colleges," *Community College Review*, April 26, 2018.