

# From Data to Insights: An Analysis of Enrollment, Retention and Completion Rates at the Cagayan State University

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Received: April 11, 2023    Accepted: May 6, 2023    Published: May 12, 2023

doi:10.5296/ijld.v13i2.20896

URL: <https://doi.org/10.5296/ijld.v13i2.20896>

## Abstract

This study utilized the data visualization technique to explore the enrollment and graduation data of Cagayan State University- Carig Campus (CSU Carig). The study analyzed data for first-time full-time first year students entering the university from the first semester of school year 2018-2019 school year to the second semester of school year 2021-2022.

The findings revealed that there were more female students enrolled in the eight colleges of the campus than male students, with the average ratio being 6:7. Most colleges had retention rates of 85% or greater, which was relatively high. However, the College of Veterinary Medicine had a retention rate of 72.47% in 2021–2022 which was substantially lower than that of the other colleges.

The study also found that in terms of gender, the retention rates varied significantly across the colleges. The College of Industrial Technology has the largest male to female ratio, which may indicate that the technical and blue collar-related nature of the degrees it offers may draw a greater share of male students. On the other hand, the College of Arts and Sciences has the lowest male to female ratio, which suggests that women are more likely to pursue careers in the humanities, social sciences, and the arts.

The retention rate for male students at the College of Engineering and Architecture was 62.13% in the academic year 2019–2020, but it significantly rose to 92.63% in 2020-2021 and 88.45% in 2021-2022, while it remained consistently higher than 80% for female students throughout all three academic years.

With 100% of students graduating in the academic year 2021–2022, the College of Medicine achieved the highest graduation rate. These findings provide useful insights for CSU Carig that can help them in their decision-making about academic programs, student support services, and overall institutional performance.

**Keywords:** completion, enrollment, graduation, patterns and trends, retention

## 1. Introduction

Universities play a crucial role in educating and preparing the next generation of leaders. It is a fundamental part of a student's life, providing them with the education, resources, and experiences that are necessary for personal and professional growth. At the university, students can receive relevant information from subject-matter specialists, interact with people from different backgrounds, and acquire crucial skills and knowledge that will help them in the workplace and in life after graduation.

Consequently, universities must gather and analyze student data to better understand the needs and experiences of their students. Furthermore, analyzing enrollment and graduation statistics using data visualization can reveal important information about the success rates of various institutions and programs as well as identify potential areas for improvement. This information provides administrators and educators to allocate their resources efficiently and to further improve their services and educational programs. It can also provide valuable information for students who may be considering attending a college or university with higher retention and graduation rates.

According to Han et al. (2012), data mining is a promising field of information and knowledge discovery that involves exploring and analyzing large blocks of information to glean meaningful patterns and trends (Twin, 2022). Setty et al. (2010) affirmed that data mining is an effective technique to extract hidden predictive information from large databases. With data mining, large volumes of data can discover knowledge and generate useful information such as retention and graduation rates.

Zhang et al. (2010) noted that there is a need to understand why students leave school, considered the use of data mining in student retention, and began developing a model for students who have the potential to leave school (Awasthi et al., 2021). Talbert (2012) noted that student retention in postsecondary institutions continues to be a challenging issue as graduation rates have continued to decline over the last decade. Moreover, Tinto (2000) highlighted that institutions must recognize that the roots of student attrition lie not only in their students and the situations they face, but also in the very character of the educational settings in which they ask students to learn while (Yu et al., 2010) mentioned that among pre-college attributes of students, data mining procedures identify transferred hours, residency, and ethnicity are crucial factors to retention. As emphasized by Caruth (2018) and Hagedorn (2006), retention rate is an essential measurement metric in education.

The National Center for Education Statistics (2022) denoted that retention rates show the percentage of first-time undergraduate students who come back to the same institution the following year while graduation rates show the percentage of first-time, full-time

undergraduate students who complete their program at the same institution within a certain period of time. Raju et al. (2015) in their study found that at least 33% from fulltime and first-time freshmen did not graduate on time while Laugerman et al. (2015) revealed that the average graduation rate for transfer engineering students was 54%.

The Cagayan State University's enrollment and graduation rates serve as crucial barometers of the institution's overall effectiveness and success. The university's enrolment has significantly increased recently, with more students enrolling in its various programs each year. Unfortunately, the retention and graduation rates have not kept up with this increase, leading to concerns about the quality of education being provided to its students.

To address these concerns and better understand the current state of the university, it is necessary to conduct a thorough analysis of its enrollment and graduation data. Hence, this research will analyze the enrollment data of CSU, including the total number of students enrolled in each program. This will provide a picture of the overall enrollment, as well as the specific programs and courses that are most popular among its students. Additionally, the research will examine the graduation rates including the number of students who complete their programs on time.

## **2. Literature Review**

Studying retention and completion rates in a university is of utmost importance as it helps to understand the factors that contribute to student success and the challenges that students face. By analyzing these rates, universities can identify areas for improvement and implement targeted interventions to improve student outcomes. In a study conducted by DeAngelo et al. (2011), they emphasized that institutions who are successful in retaining and graduating their students would be projected to have actual degree attainment rates that exceed their expected rates. As noted by (Eichelberger et al., 2020), students who have completed a personal finance course had a significantly higher probability of year-to-year retention and successful degree completion.

Understanding the reasons why students withdraw from school before finishing their degrees would lead to a better assessment of retention and completion rates. High dropout rates can negatively affect the university's reputation as well as the students themselves, who may suffer financial and psychological repercussions. McGiveney (1996) described a number of ways in which a student can fail to complete a course: some enroll but never begin the course; some go through a formal withdrawal procedure; others stop attending or failing to complete the necessary tasks without formally withdrawing; some finish the necessary tasks but fall short of the standards and subsequently leave.

Universities can improve retention by addressing the issues that lead to student dropout by identifying the contributing variables. Universities have a responsibility to ensure that they are providing students with the resources and support they need to succeed. By regularly analyzing and reporting on retention and completion rates, universities can demonstrate their commitment to student success and accountability to stakeholders, such as government agencies, accrediting bodies, and funding sources.

### 3. Method

The study employed the quantitative research design, utilizing secondary data from the Registrar’s Office of Cagayan State University to analyze student enrollment, retention, and completion rates from 2018-2022. Data was analyzed for first-time full-time first year students entering the university from the first semester of school year 2018-2019 to the second semester of school year 2021-2022. Students who enrolled in the prescribed number of units in the course curriculum were considered full time. The study explored the CSU Carig student data which involves the use of data cleaning and preparation to remove duplicates, correcting errors and filling in missing values. Likewise, clustering and data visualization techniques were used to uncover patterns and trends in the data.

### 4. Results and Discussion

Enrolment, retention, and completion rates among college students are important indicators of academic success and can have significant impacts on both individual and institutional outcomes. In this study, the data visualization technique was utilized to explore enrolment, retention, and completion rates among students of CSU Carig, a public higher education institution in the Philippines.

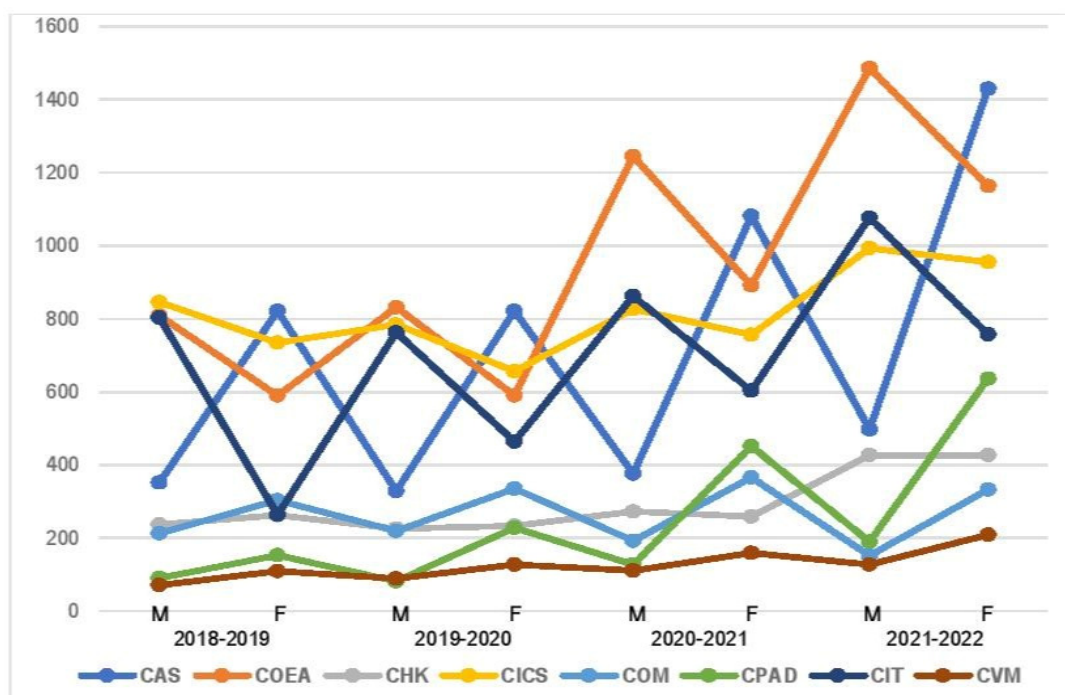


Figure 1. Enrollment trend for four (4) years

The figure shows the enrollment trend in the eight (8) colleges of the campus from 2018 to 2022. The average ratio of male to female students is 6:7, which means that for every 6 male students, there are 7 female students. This suggests that there is a higher proportion of female students compared to male students enrolled in these colleges. However, it is important to

note that the actual ratio of male to female students may vary in different programs within these colleges. It is possible that some programs may have more male students while others may have more female students.

In the case of the College of Industrial Technology (CIT) having the highest male to female ratio, it is possible that the programs offered are technical and mostly related to blue collar jobs and therefore attract a higher proportion of male students. Some research suggests that males are more likely to be attracted to fields that are traditionally seen as being "masculine," such as those that involve technology, engineering, and skilled trades. On the other hand, the College of Arts and Sciences (CAS) has the lowest male to female ratio, which means that females may be more likely to pursue fields that are traditionally seen as being "feminine" such as those in the arts, humanities, and social sciences.

It is important to note that these patterns are not fixed or universal, and individuals of any gender can pursue and excel in any field of study. However, societal norms and expectations can play a role in shaping the decisions that students make about their education and career paths.

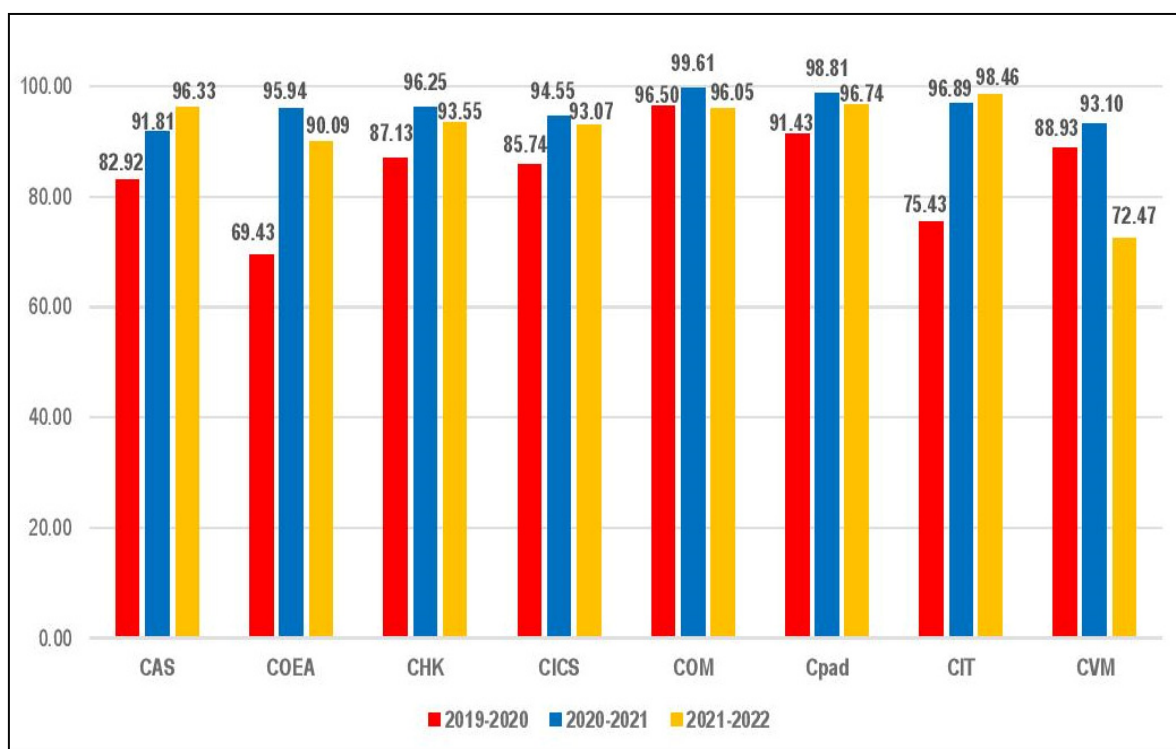


Figure 2. Retention Rate for 2018-2022

The chart shows the retention rate for each college for three academic years using the 2018-2019 enrollment as the baseline data. Overall, the retention rates for most colleges are relatively high, having retention rates of around 85% or higher. In 2019 and 2020, the College of Medicine (COM) got the highest retention rate of 96.50% and 99.61% respectively while in 2022, the retention rate for CIT was 96.81%, which means that almost all students who

enrolled in CIT in the previous academic year returned to CIT for the current academic year. However, the retention rate for the College of Veterinary Medicine (CVM) is much lower than the other colleges, with a retention rate of only 72.47% during the school year 2021-2022. This could potentially be a cause for concern for the institution and might warrant further investigation.

Similarly, the retention rate for the College of Engineering and Architecture (COEA) was 69.43% in 2019-2020, 95.94% in 2020-2021, and 90.09% in 2021-2022. This suggests that the retention rate for COEA has improved significantly over time, with a significant increase from 2019-2020 to 2020-2021 and a slight decrease from 2020-2021 to 2021-2022. While the student retention rate for CAS, as shown in the chart, appears to be quite high. Over the three academic years listed, the retention rate is consistently above 80%, with a high of 96.33% in the fourth year. This indicates that a large percentage of students in CAS return to school every academic year.

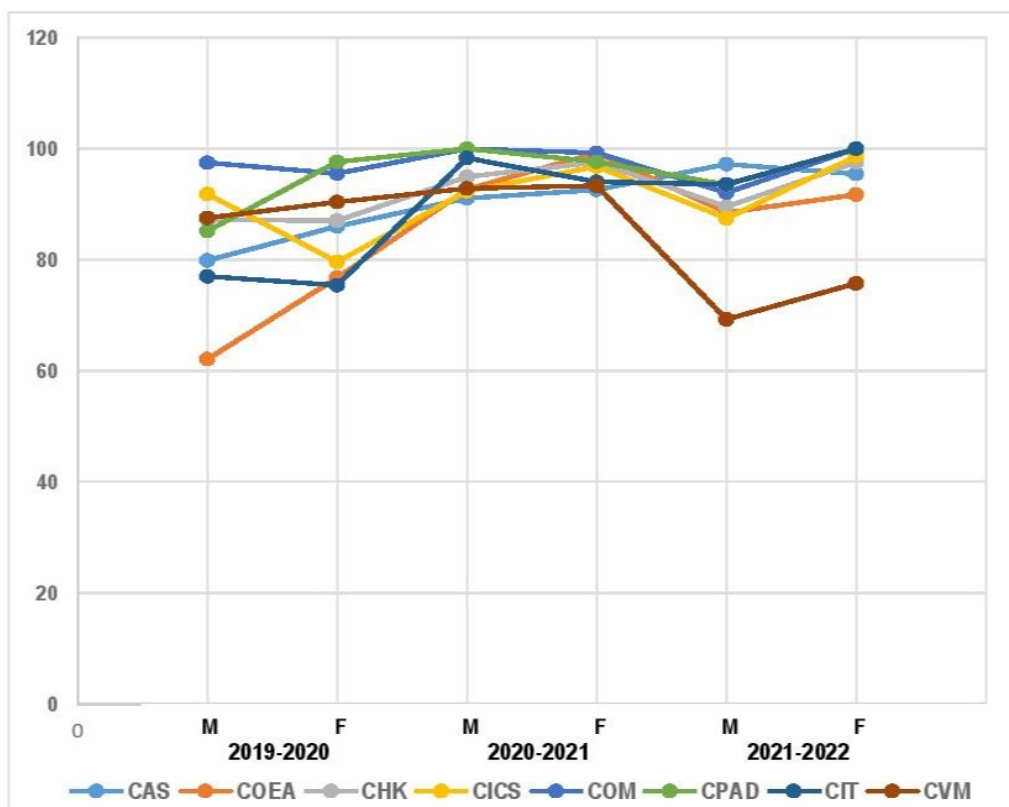


Figure 3. Student retention rate based on Gender

The student retention data represents the percentage of students in different colleges who returned for three academic years, split by sex. As shown in the graph, male students who returned in CAS has increased from 79.84% in the first academic year to 91.04% in the next year and 97.22% in the third academic year. The percentage of female students who returned also increased over time, from 86% in 2019-2020 to 92.58% in 2020-2021 and 95.45% in 2021-2022.



Another trend that can be observed in the data is that retention rates vary significantly across the colleges. For instance, the percentage of male students who returned in COEA was significantly lower in the first academic year (62.13%) compared to the second (92.63%) and third (88.45%) academic years. The percentage of female students who returned was also lower in 2019-2020 (76.73%) compared to 2020-2021(99.25%) and 2021-2022 (91.73%). In contrast, both male and female students of COM had consistently high retention rates over the three academic years, with all male students and 95.56% of female students returning in the first academic year, 100% of male and female students returning in the second academic year, and 92.11% of male and 100% of female students returning in the third academic year.

A gender gap can also be observed in the data, with female students generally having higher retention rates than male students. In the College of Engineering and Architecture, the gap is significant, with female students having much higher retention rates than male students in the second and third academic years. Similarly, in the College of Veterinary Medicine, the gap is also significant, with female students having consistently higher retention rates than male students in the first two academic years, but a much lower retention rate in the third academic year.

Overall, the student retention data provides insight on the trends and patterns in retention rates among male and female students of CSU Carig over a period of three academic years, hence, the data is specific and may not be representative of retention rates of the other campuses of the University.

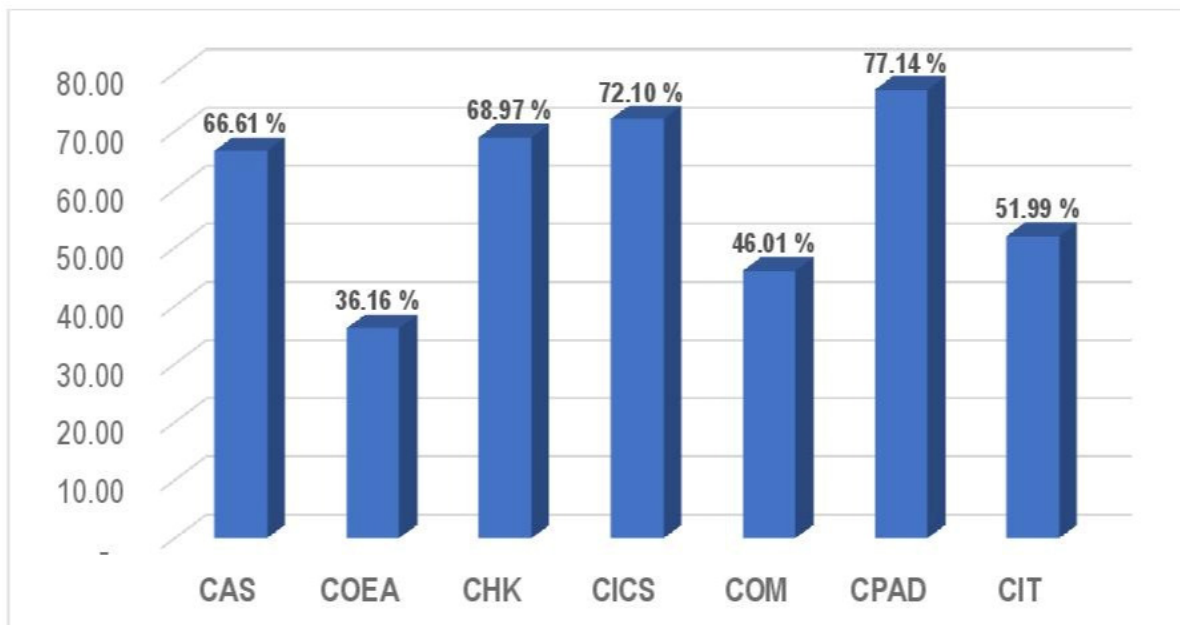


Figure 4. Completion Rate for the Academic Year 2022

Figure 4 shows the percentage of students who completed their degree in 2021-2022. The data covered the 2018-2019 student enrollment data for regular students across the different

colleges of the campus.

As shown in the chart, the College of Arts and Sciences had a completion rate of 66.61%, which was higher than the completion rate of COEA with 36.16%. However, the completion rate of CAS was lower than the completion rate of the College of Human Kinetics (CHK) with 68.97%. The completion rate of CICS was 72.10%, which was higher than the completion rate of CAS but lower than the completion rate of CPAD. The completion rate of COM was 46.01%, which was lower than the completion rates for all the other colleges except for the College of Engineering and Architecture. The completion rate for the College of Public Administration (CPAD) was 77.14%, which was the highest of all the colleges. The completion rate of CIT was 51.99%, which was higher than the completion rate of COEA and COM but lower than the completion rates for the other colleges.

The chart presented a very significant trend in the student completion rate data, that is, some colleges have high completion rates, others have low completion rates while the rest fall somewhere in the middle. It is worth mentioning that the College of Public Administration has the highest completion rate of all the colleges at 77.14% and so with CICS with a relatively high completion rate at 72.10%. On the other hand, the College of Engineering and Architecture has the lowest completion rate of 36.16%. This may be because COEA has a challenging curriculum that requires a significant amount of time and effort to complete an engineering degree.

The College of Veterinary Medicine was not included in the analysis of the completion rate since it is a 6-year degree program.

## 5. Conclusions and Recommendations

Based on the data presented, it was found that there is a higher proportion of female students compared to male students enrolled in the eight colleges at CSU Carig. The College of Information and Computing Sciences had the highest enrollment among all the colleges from 2018 to 2020, while the College of Engineering and Architecture had the highest enrollment from 2020 to 2022. The retention rates for most colleges are relatively high, with retention rates of around 85% or higher. However, the retention rate for the College of Veterinary Medicine is significantly lower than the other colleges, with a retention rate of only 72.47% in 2021-2022. This could potentially be a cause for concern for the institution and might warrant further investigation. The retention rate for the College of Engineering and Architecture has also improved significantly over time, with a significant increase from 2019-2020 to 2020-2021 and a slight decrease in 2020-2021 to 2021-2022.

Generally, the enrollment and retention rates of CSU Carig are generally high, though there are some differences among the colleges. The data also indicates that, in general, female students have higher retention rates than male students, although this is not the case in all the colleges. Similarly, the student completion rate data shows that some colleges have high completion rates, while others have low completion rates and the rest fall somewhere in between.

Based on the results, the researcher therefore recommends that a further investigation should



be made on retention and completion to include factors such as academic performance, financial considerations, and personal circumstances.

### Acknowledgments

The researcher would like to express his gratitude to the CSU administration for all the support and special thanks to the hardworking staff of the registrar's office.

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