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Will They Come? – Understanding the Student Demographics of a First of its Kind Doctor of Technology Online Program in a Tier-1 University

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Understanding the Student Demographics of a First of its Kind Doctor of Technology Online Program in a Tier-1 University

Abstract

At this writing, there are approximately 332 million people in the United States. Of this, approximately 36% of the U.S. population has a bachelor's degree; this is up from 29.9% a decade earlier in 2010. In 2000, one-third of people with at least a bachelor's degree had completed an advanced degree. By 2018, 37 percent had done so. The number of people with master's degrees, then is roughly 13% of the current U. S. Population. The number of people with professional degrees is roughly 1.2%, while the number of people with Doctorate degrees is close to 2.2%

Given this, what is the interest and likelihood of those with master's degrees pursuing an online Doctor of Technology degree? And, demographically, who are those students?

The Doctor of Technology (DTECH) program of this paper was nearly six and a half years in the making. It began with a committee envisioning a degree concept through a yet to be defined academic curriculum. To gain final approval of this degree, an exhaustive compare and contrast was performed of comparable, or similarly situated programs across all levels of academic institutions.

On approval from the Commission for Higher Education, the DTECH proposal authors forecasted a semester over semester enrollment of ten new students. Given the program was designed as a three-year program, it was anticipated the program would have a steady state enrollment of roughly 30 students. After two semesters, the program experienced an extraordinary and unexpected enrollment explosion of over 200 students.

With an in-depth understanding of the students, program originators can assess not only demographic attributes, such as gender, age, race, and ethnicity, but also the range of prior academic degrees conferred. This data multiplicity provides rich insight into market comparison between those students anticipated and those realized. The value of such data resides in knowing versus not knowing and the practical and tactical implications therein. This latter thought of the value of such data is addressed in the conclusions.

This paper will take a first look at available demographic data to better understand the students who participate in this program. Available data on gender, race, ethnicity, academic backgrounds, and business/industry type will be explored.

Doctor of Technology Evolution and Definition -

The Doctor of Technology (DTECH) degree evolved over a six- and one-half year period prior to being approved in the fall of 2019.

In 2011, a thought-leading team of graduate-oriented faculty from discipline-specific departments was assembled to research and conceptualize what such a degree might look like and how it might be best delivered. The team launched three parallel research efforts [1], [2], [3]:

- To ascertain what precedents and experiences with similar goals existed around the world, i.e., an international review of other doctoral programs addressing similar needs.
- To begin the process of identifying the curriculum and course content of the program.
- To conduct an interest and needs assessment of a sample of high probability individuals.

The findings of all studies were positive, and their key features incorporated into subsequent decision making [4], [5].

Then, in the fall of 2019, the DTECH degree program was approved, after having been passed through the internal university approvals and the State's Commission of Higher Education.

The Business Need –

For-profit business and industry exist to benefit the shareholders [6]. They do so through the offering of products and services which meet the ever-changing demands of their respective customers. To meet the needs of customers, business and industry requires a strong technological focus, one premised on constant innovation and improvement. To this end, business and industry firmly resides in the use-inspired and pure-applied spectrum of the engineering-technology educational curriculum continuum.

From a macro view, there are five major phases to a product's life cycle: concept exploration, demonstration and validation, full scale development, production and deployment, and operations and support. Each of these life-cycle phases is punctuated with use-inspired and pure-applied application of technological understanding and advancement [7]. Failure to be a "technology" company most readily results in declining market share and reduced value and return to shareholders, which, runs counter the basic premise of maintaining and growing an on-going economic concern. Business and industry is in the "technology" business.

A Technology Doctorate would focus on the use-inspired and pure-applied engineering-technology educational curriculum continuum which maps directly to the premise for sustainability and growth of a given business/industry [8], [9].

The Student Need –

Professional adult learner students of a Doctorate in Technology would pursue a terminal degree targeting use-inspired and pure-applied knowledge for one or both of two reasons: (1) to better serve the needs of their respective organizations and ultimately their end users/customers, and/or (2) to advance their careers either within their current organizations or another as opportunities exists.

Additionally, there is a growing recognition, as documented in the literature, that higher levels of education are required to gain fruitful employment that once required a lesser educational skill set. According to the Bureau of Labor Statistics, roughly 36% of the U.S. population of 315M individuals have BS/BA degrees, this higher than any previous period in U.S. history. Master's degree holders make up roughly 13% of this same population with holders of Doctoral degrees residing at 3%.

Given the significant growth in the supply of intellectual capital, both nationally and internationally, in these last two decades, gaining access to employment opportunities that used to require a high school degree now require a BS/BA degree. The MS degree is used as the primary source of differentiation between business/industry employed individuals. Those possessing the knowledge and skills of a doctoral level education may expect to not only further differentiate themselves in terms of educational cognition, but by their ability to provide greater technology innovation management and leadership.

In essence, the more education one acquires, the greater the likelihood for continued gainful employment and the greater the financial rewards. As is the case with any entrepreneurially oriented individual, the acquisition of a doctoral level education is highly sought after. Current wait lists reflect this backed-up demand.

Job Role Differentiation and Rewards –

In business/industry titles and roles map to product life cycle phases. As a project evolves from Concept Exploration to Operations and Support, different skill sets are required. In the early phases of the product life cycle, research and systems thinking/engineering are dominant. As the product life cycle moves to the right toward full scale development, systems operation and engineering gives way to product design, development, and systems integration. This left to right transition in the product life cycle requires a transitioning from a higher level of systems understanding to a tactical level of team and individual discipline-specific knowledge; software engineering, hardware engineering, operations and the specialty engineering disciplines.

Given this natural transitioning of required knowledge and understanding, those individuals with discipline-specific knowledge would expect to, and would generally, be promoted into positions

requiring higher levels of cognitive functioning upon conferment of a Doctorate in Technology and demonstrated skills.

The promotion in role responsibility with attendant title, naturally create greater financial rewards for the individual as the individual's demonstrated contributions to the company increase.

Pre-Program Survey Results -

To better understand the demand for the proposed Doctor of Technology degree, the DTECH leadership team administered a Qualtrics survey to past and current students (1999-2017) of professional fee-based credit programs who have either graduated or are planned to graduate in the spring of 2017. The survey asked each recipient to rate their interest in a new Doctor of Technology (D. Tech.) degree, as described in this paper, on a Likert scale of 0 to 5, where 0 = no interest and 5 = very interested.

Of the 978 surveys sent, there were 334 respondents (34%). Of the 334 respondents, 219 (66%) were either "very interested" or "interested" in the newly proposed Doctor of Technology program. Of the 334 respondents, 80 (24%) said they "might have an interest" in the newly proposed program. Figure 1 below depicts the number of respondents per Likert selection.

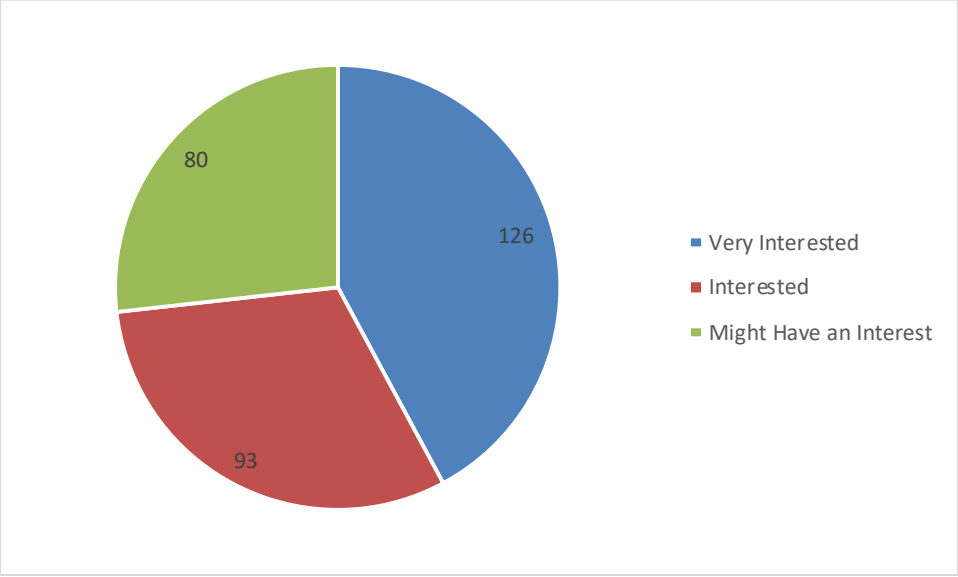

Figure 1. Number of Respondents by Interest Level

Of the 219 respondents who were either very interested or interested in the newly proposed Doctor of Technology program, 109 (50%) said there were likely to receive some form of company financial support.

Of the 219 students who were either very interested or interested in the newly proposed Doctor of Technology program, 191 respondents were U.S. citizens. Of the 191 respondents who were U.S. citizens, 103 (53.9%) were from inside the state of Indiana, while 88 respondents (46.1%) were from outside the state of Indiana. Figure 2 depicts the in- versus out-of-state residents.

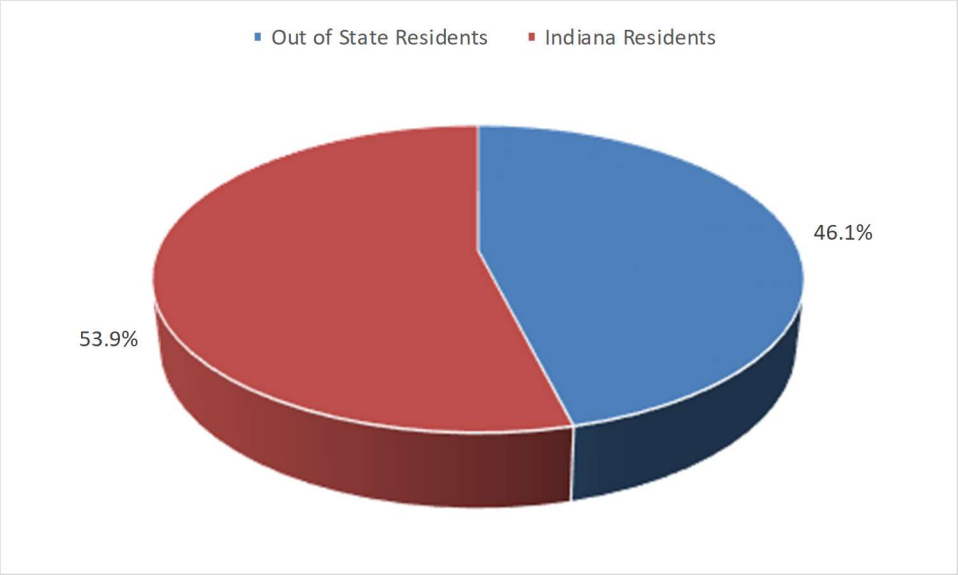

Figure 2 In-State Versus Out-of-State Who Have an Interest in the Program

Of the 219 respondents, 191 (87%) were from within the U.S., while 28 respondents (13%) were outside of the U.S. Of the 28 respondents from outside of the U.S., the largest populations were from Nigeria (3.7%), Kenya (2.7%) and Uganda (2.3%). Figure 3 reflects the number of respondents by country.

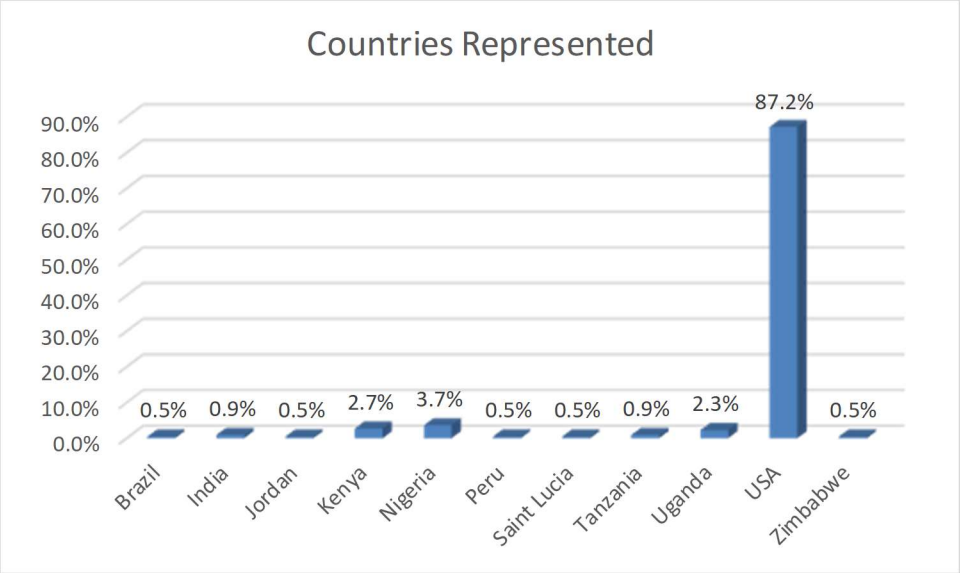

Figure 3. Number of Respondents by Country of Origin

Of the 219 respondents, there were 159 unique companies represented. With the top industries being pharmaceuticals, defense, and heavy machinery respectively.

Relative to which cohorts the 219 students represented: of the 219 respondents:

- 67 (31%) were from a previous weekend distance-hybrid program (with 55% from the Leadership weekend program)
- 66 (30%) were from the Biotechnology and Regulatory Science cohorts
- 37 (17%) were from information technology and related cohorts
- 21 (9.6%) were from aviation and related cohorts

Figure 4 depicts the number of respondents by previous administered programs.

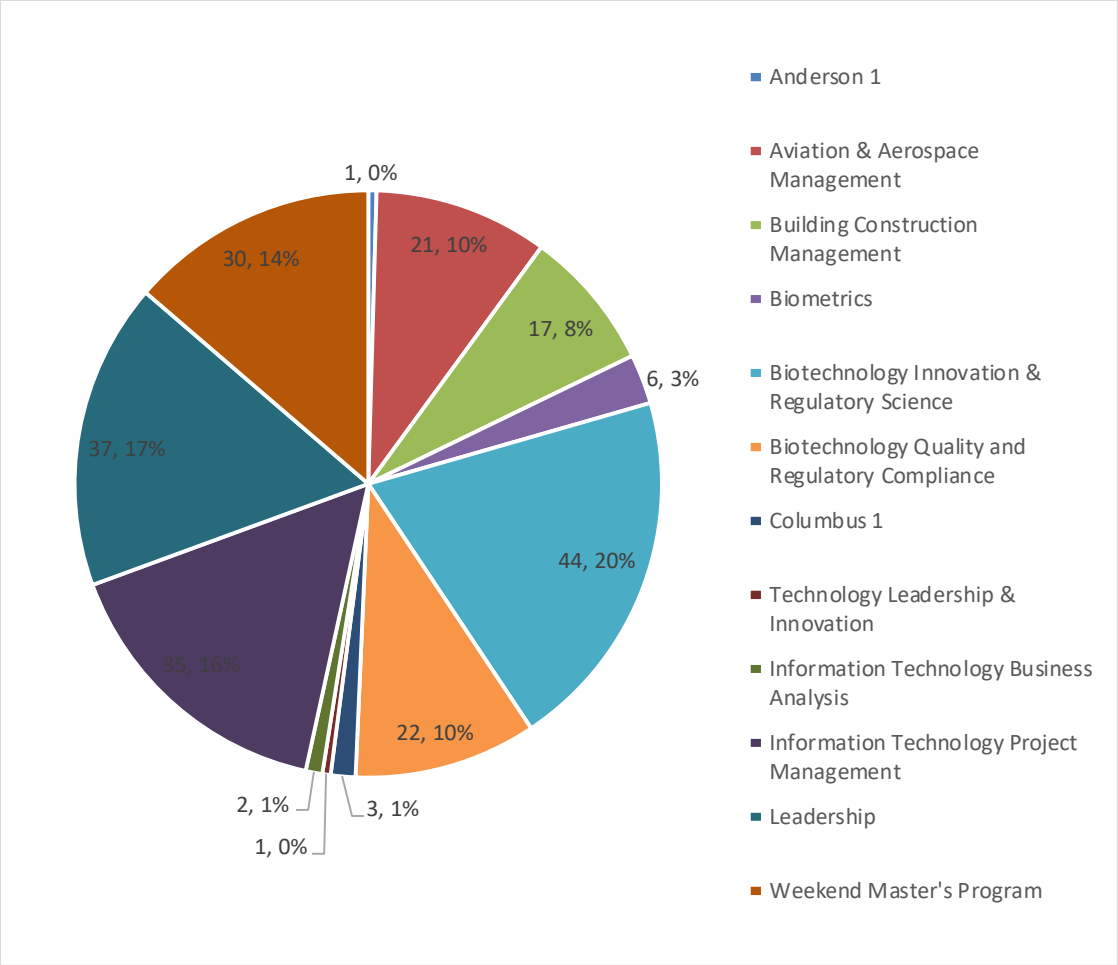

Figure 4. Number of Respondents by Previously Administered Programs

Of the 219 respondents, the average age is 41 years of age. The largest single age range was 31-35 years of age (22%), followed by 36-40, 41-45 and 46-50, each at 16% respectively. The chronological age of the respondents is directly related to the number of years of work experience, and subsequently as a professional working adult learner.

Age	# of Respondents	Percentage of Respondents
22-25	5	2%
26-30	24	11%
31-35	48	22%
36-40	36	16%
41-45	34	16%
46-50	34	16%
51-55	19	9%
56-60	13	6%
61-65	6	3%

Table 1. Percentage of Respondents by Age Cohort

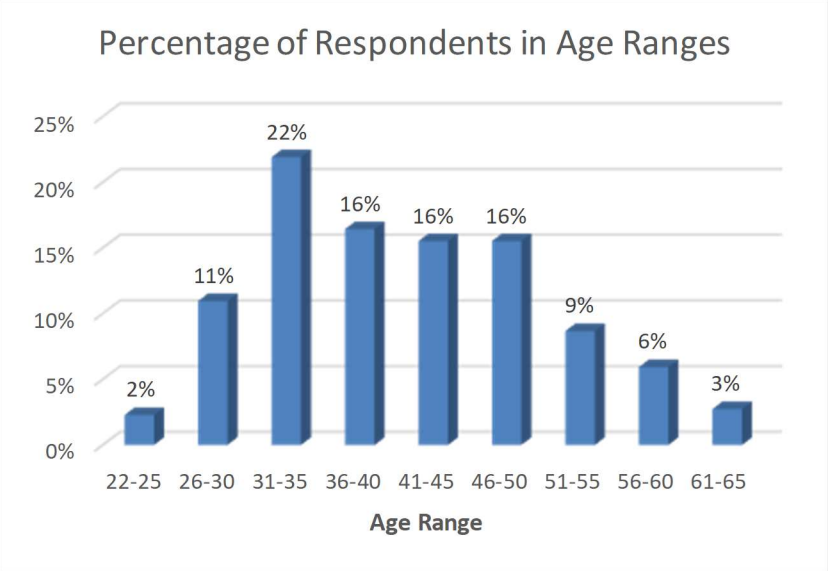

Figure 5. Graphical Depiction of Respondents by Age Cohort

Of the 219 respondents, 145 (66%) were male, while 74 (34%) were female.

Gender	# of Respondents	Percentage of Respondents
Male	145	66%
Female	74	34%

Table 2. Respondents by Gender

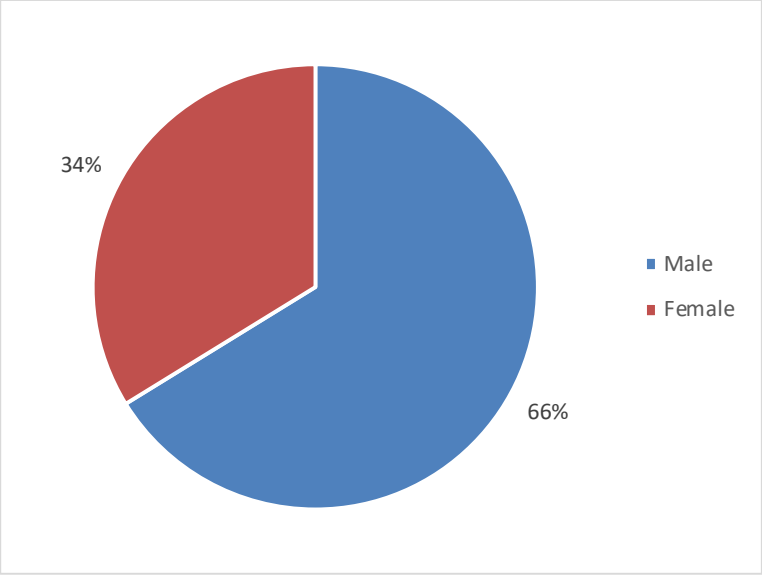

Figure 6. Percent of Respondents by Gender

While ethnicity reporting is voluntary and highly variable, of the 219 respondents reporting, 105 (48%) self-reported as being underrepresented minorities. Of the 105 respondents who self-reported, the largest ethnicities were black or African American (58%), Asian (23%) and Hispanic (19%).

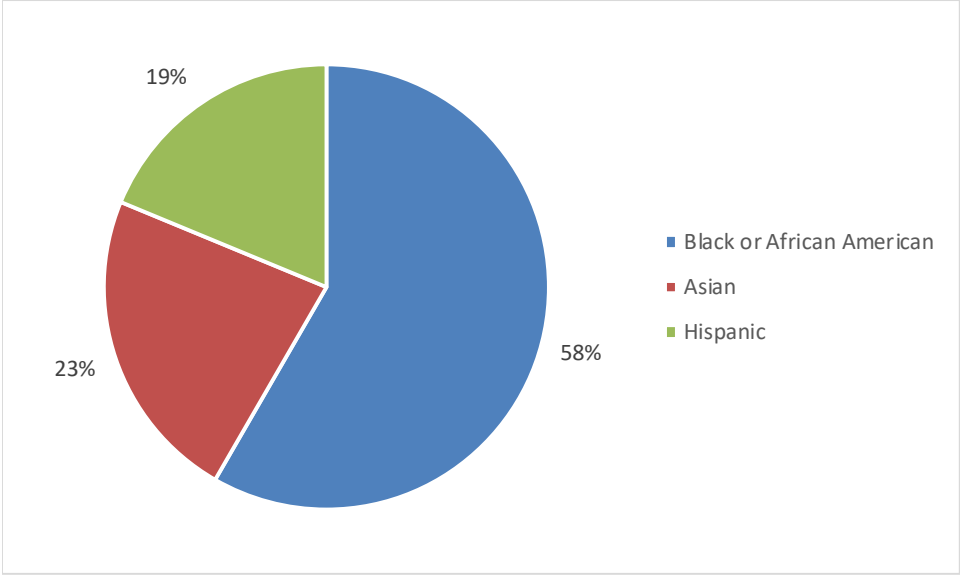

Figure 7. Percent Respondents Self-Reporting as Underrepresented Minorities by Ethnicity

Current Findings –

At this writing, there are approximately 248 active students participating in the Doctor of Technology degree program. Given the program's inception in the fall 2019, these many students are at varying levels of program completion.

Current demographic data provides insight class participant citizenship, gender, race/ethnicity, and age.

Current participant data allows for comparison to previously forecasted participation at the time of the original proposal put forth for program approval.

Original potential student participants reflected a response of roughly 87% residing in the U.S., while international represented the remaining 13%. Current data suggests 95% of the total student participants are U.S. citizens, while approximately 5% are international students.

Figure 8 depicts this finding.

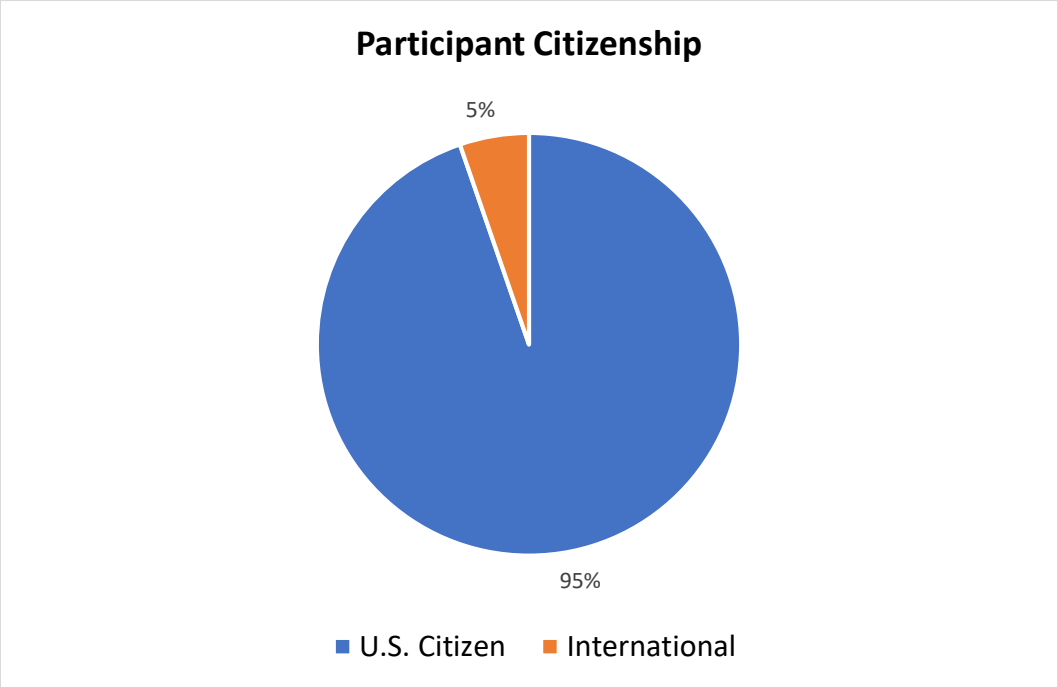

Figure 8. Cumulative Participants by Citizenship

Original Qualtrics inquiry reflect a potential student interest of approximately 34% female and 66% male. Current student gender demographics depicts 27% female and 73% male. This is reflected in figure 9 below.

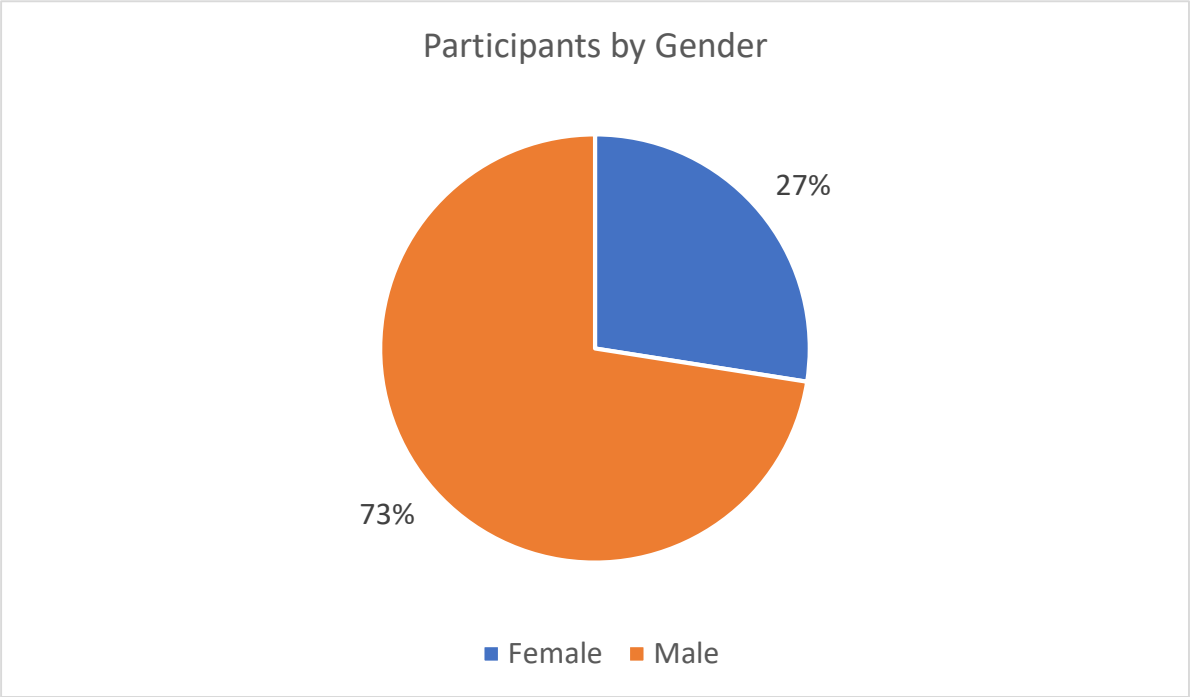

Figure 9. Cumulative Participants by Gender

Current student race and ethnicity demographics depicts the predominate cohorts to be non-Hispanic White at 60%, Black or African American at 17%, Asian at 11%, followed by Hispanic at 7%, American Indian or Alaskan Native at 4%, and Native Hawaiian or Other Pacific Islander at 1%.

The original Qualtrics survey showed that 52% of non-Hispanic White had an interest in the program, followed by 48% representing cumulative underrepresented minorities.

Figure 10 below depicts this finding.

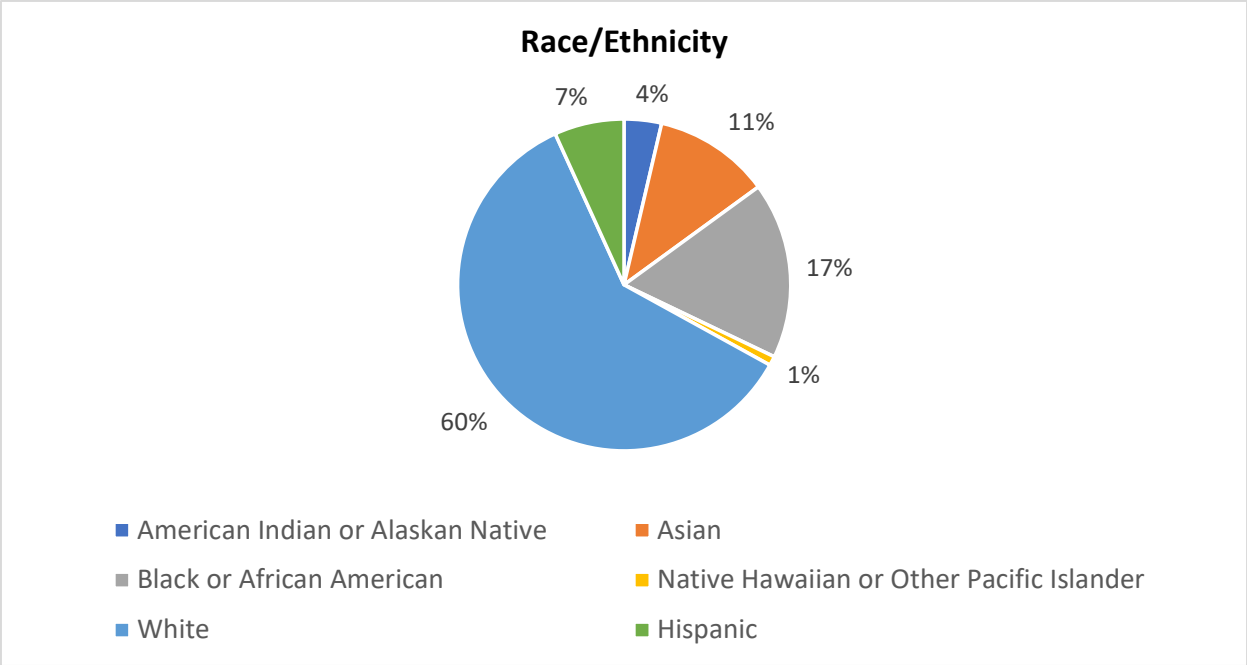

Figure 10. Cumulative Participants by Race and Ethnicity

Of the original Qualtrics 219 respondents, the average age is 41 years of age. The largest single age range was 31-35 years of age (22%), followed by 36-40, 41-45 and 46-50, each at 16% respectively. The chronological age of the respondents is directly related to the number of years of work experience, and subsequently as a professional working adult learner.

Current findings reflect the largest age cohorts are in the 31-35, 36-40, and 41-45 age groups. Where, each age cohort represents 18%, 19%, and 19% respectively.

The next largest age cohorts are 46-50 and 51-55 with 13% and 11% respectively.

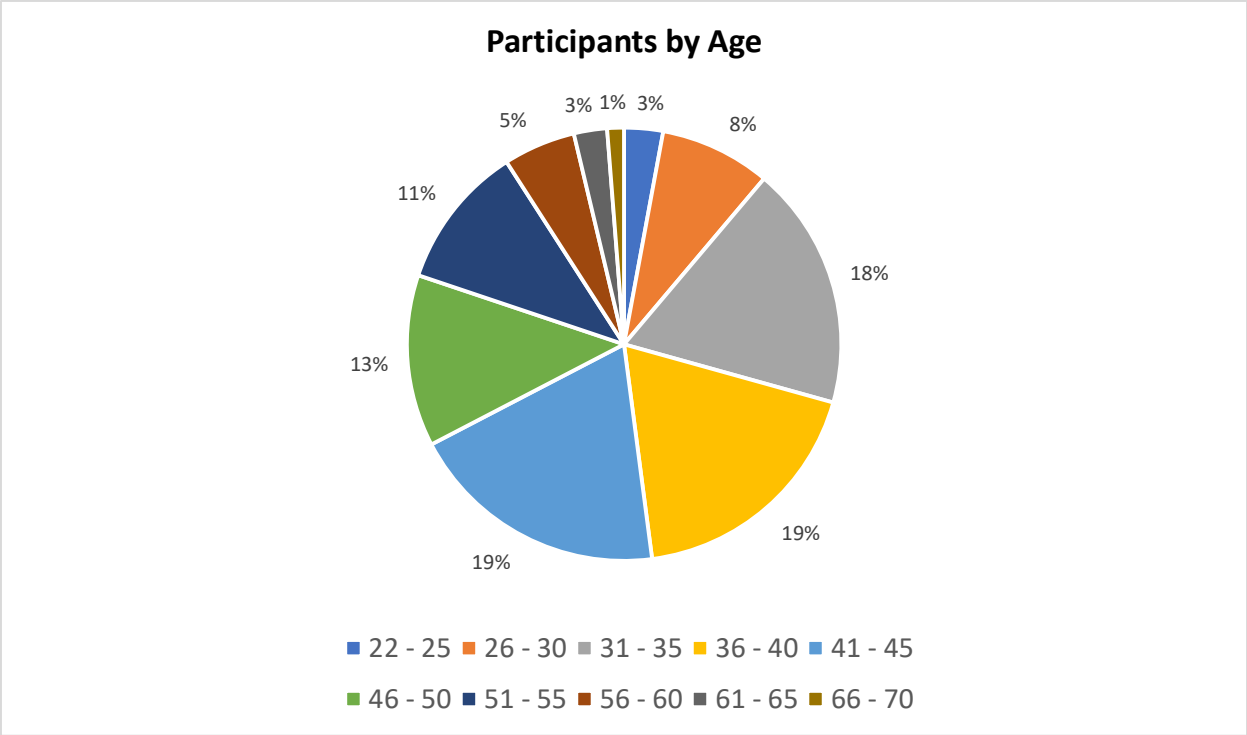

Figure 11. Cumulative Participants by Age

Conclusion –

The original Qualtrics survey was intended to make informed decisions on whether there was an interest in the newly proposed Doctor of Technology degree. Additionally, what demographic cohorts might be represented. From this survey, there appeared to be a significant interest. The actual active student enrollment significantly exceeds this originally identified demand, this with over 200 active students in the first two semesters.

While the original Qualtrics survey was most useful in determining interest by varying demographic cohorts, the program was not advanced solely on these demographic cohort data. Interestingly, current active student participation in the Doctor of Technology program closely resembles the original Qualtrics demographic cohort data with minimal, yet to be researched exceptions.

While differences between original Qualtrics survey demographic cohort data and current active demographic cohort data are relatively small, a deeper dive into those differences would prove insightful for future forecasting purposes.

Questions for future research include:

1. What percentage of active demographic cohort students were part of the original Qualtrics survey?
2. On a demographic-by-demographic cohort basis, what social or economic factors contribute to significant differences [10]?
3. How has the 2019-2020 COVID pandemic impacted active student enrollments, and have different demographic cohorts been disproportionately impacted?

While the above research questions provide valuable insight into applicability of future potential interest, it is apparent from current active student enrollments that a Doctor of Technology program, offered through a 100% distance modality is highly desirable.

The data collected, may be assimilated and applied in future decisions attendant to program revenue versus cost, target demographic cohorts and marketing niches of interest to the offering college/university.

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