Advantages and Disadvantages of a Computer Networks Technology Course for Adults

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Abstract

This study examines the variables that influence the academic performance of adult students who are enrolled in a computer network certificate programme. We conducted a thorough analysis of 2442 individuals who were selected from a pool of 256 different universities. All participants were individuals over the age of 18 who were enrolled in the Cisco Certified Network Associate (CCNA) technical training programme as "non-degree" or "certificate" students. The achievement of adult learners was identified by doing a multilevel analysis to determine the influencing elements. The findings of the Hierarchical Linear Model (HLM) study revealed that several factors influenced the academic performance of adult learners at the beginning of the programme. These factors include age, gender, occupation, degree orientation, motivation, and computer technical expertise of the participants. Contrary to prior studies, the analysis revealed that adult learners who work full-time perform better than those who do not. Furthermore, the effects at the institutional level did not have any impact on academic performance. The study's conclusions offer crucial insights for the creation of a framework that will direct research and application in technology certificate programmes.

Keywords: Adult learning; lifelong learning; distributed learning environments

Introduction

Those persons who are interested in acquiring new skills or improving the ones they already possess can benefit from the cost-effective and concentrated learning settings that are provided by technology certificate programmes. According to Meares and Sargent (2003), the primary demographic composition of certification courses in the field of technology in the United States is primarily comprised of adult learners. Performance-based evaluation tools are utilised by the majority of these certification programmes in order to evaluate the development of the students. According to Adelman (2000), in order for individuals to be eligible for certification, they must fulfil certain competency standards. An investigation was carried out with the purpose of examining the impact that particular participant and institutional level variables have on the academic performance of adult learners who are enrolled in the Cisco Certified Network Associate (CCNA) curriculum. The curriculum is designed to be accessible to people of a wide range of ages and backgrounds, and it is implemented at non-traditional educational institutions such as high schools, colleges, universities, and other academic institutions. To successfully complete the programme, you will need to successfully complete four separate classes in a row. The atmosphere at Cisco Networking Academy is comprised of four primary components, which are as follows: Among the components of the system are the following: 1) a curriculum that is based

on the internet and is centralised; 2) online tests that are based on established standards; 3) instruction that is locally managed and scheduled; and 4) an infrastructure that supports teacher certification, continuing education, and provides ongoing support. The term "hybrid" learning environment refers to a scenario in which multiple types of media are included into the teaching process in a classical classroom setting.

Learner Achievement in Technology Certificate Programs

People who are interested in acquiring new skills or improving the ones they already possess can benefit from the specialised and cost-effective learning environments that are given by education programmes that are based on technology certificates. According to Meares and Sargent (2003), the majority of individuals who are enrolled in certification courses in the technology business in the United States fall into the category of adult learners. The majority of these certification programmes make use of performance-based evaluation techniques in order to evaluate the progress that the students have made. According to Adelman (2000), in order for candidates to be eligible for certification, they must demonstrate that they have reached a certain level of competency. An investigation was carried out to investigate the impact of specific factors at the institutional and participant levels on the academic performance of adult learners who are enrolled in the Cisco Certified Network Associate (CCNA) programme. The focus of the investigation was on the academic performance of adult learners. The curriculum is adopted by non-traditional educational institutions, such as high schools, colleges, universities, and other academic facilities, with the intention of ensuring that it is accessible to students who come from a variety of age groups and backgrounds. In order to properly complete the programme, it is necessary to finish four different classes in a logical progression. There are four fundamental components that make up the ambiance at Cisco Networking Academy, and they are as follows: The following elements make up the elements that make up the system: The following components are included in the system that is being proposed: 1) A curriculum that is centralised and can be accessed through the internet; 2) Assessments that are carried out online and meet the certain criteria that have been specified; 3) Instruction that is administered and scheduled at the local level; and 4) An infrastructure that supports teacher certification, continuing education, and ongoing support. One definition of a "hybrid" learning environment is an instructional process that takes place in a conventional classroom setting and incorporates a variety of other types of media.

Participant level Factors

During the course of this research, three participant-level variables were investigated: demographics, computer aptitude, and determination. Obtaining and analysing demographic information pertaining to the participants is absolutely necessary in order to have a thorough picture of the differences that exist across the different student cohorts (Schreiber, 2002). In general, males demonstrate a higher level of enthusiasm and competence than females do in computer-related technical courses, as stated by Crombie and Abarbanel (2000) and Green (2000). Age and employment status are two examples of demographic distinguishing features. One of the most important factors that determines the success of an adult learner is their age. According to the notion that was given by Justice and Dornan (2001), older students are predicted to display greater academic performance compared to younger pupils. This is due to differences in cognitive development as well as the variety of academic and life experiences that are shared by different generations. Within the context of technology

certificate programmes, it is quite probable that the participant's current place of employment will have an effect on their academic achievement. It has been demonstrated in previous research (King & Bannon, 2002; Paul, 1982) that college students who work full-time have a lower rate of academic achievement compared to those who work part-time or not at all. The level of computer expertise possessed by the participants is the second significant aspect that impacts their capabilities. Students who possess these essential skills have the ability to improve their performance in computer classes, which is a significant competitive advantage. It is more likely that participants in the curriculum will acquire new information about networking if they have a strong command of computer skills (Cashion & Palmieri, 2002; Kennedy, 2000; Thompson & McGrath, 1999). However, having a strong command of computer skills cannot guarantee this.

In this study, elements at the participant level were evaluated, with motivation being the final component that was investigated. The beliefs, objectives, and anticipations of an individual are directly responsible for determining the extent to which they engage in learning. According to Eccles and Wigfield (2002), a number of studies have shown that there is a significant correlation between the level of desire and involvement that an individual possesses and their level of achievement. Students are more likely to achieve higher levels of performance if they place a higher priority on conducting study on the subject matter and have higher ambitions for their academic attainment, as stated by Wigfield and Eccles (2000). There is a comparable significance to long-term objectives. It is possible for an individual's professional goals to serve as their ultimate objective. According to Alpern (2000) and Haislett and Hafer (1990), individuals who have selected a job that is closely associated with an educational programme typically get better results than those who do not have a clear understanding of their goals. As a result, these individuals are more likely to be successful. It is possible for an individual's desire to continue their education to have an effect on their level of motivation and level of academic performance. (de la Harpe & Radloff, 2000) Adult learners who approach lifelong learning with a positive outlook generally exhibit characteristics such as perseverance, autonomy, and confidence in their ability to learn. According to Zimmerman and Martinez-Pons (1992), students make excellent use of cognitive strategies in order to enhance all aspects of their educational experience.

Institutional level Factors

There are a variety of academic levels in secondary schools, community colleges, and universities that offer the Certified Community Nursing Assistant (CCNA) training. This training is not only offered in work centres and homeless shelters. Adult students have the opportunity to enrol in the CCNA courses presented by any of the academic institutions that have been mentioned. The fact that colleges are required to adhere to specified regulations in order to provide CCNA courses does not change the fact that there are unavoidable variances in the technology and instructional resources that are available among these institutions, which may have an impact on the performance of students. It is anticipated that the location of an institution, regardless of whether it is situated in an urban, suburban, rural, or small town context, will have an effect on the effectiveness of the institution. According to Barker (1985), Hannaway and Talbert (1993), and Lee and McIntire (1999), this is due to the fact that different locales have different levels of resource availability, as well as diverse organisational and social settings. Despite the fact that the patterns that are responsible for these disparities are not easily understood, the differences in education that exist between institutions

located in metropolitan areas and those located in suburban and rural areas suggest that there may be significant differences in the academic achievement of students who attend these institutions. Studies that were carried out by Everson and Millsap (2004), Kozol (1991), and Lee (2001) have provided evidence in favour of this assertion.

Bracey (1995), Verstegen and King (1998), and Walberg (1984) are just a few of the studies that have demonstrated that the socioeconomic status of the participants is a significant factor in determining the level of accomplishment that learners achieve. A person's social standing can be inferred from the presence of a house, regardless of the level of poverty that the dweller may be experiencing. Students who come from economically poor places, such as empowerment zones and communities that encourage entrepreneurship, are expected to have inferior academic performance compared to students who come from more developed regions, as stated by Tajalli and Opheim (2005). There is a high probability that students who attend schools situated in areas that are socioeconomically impoverished will demonstrate a lower level of academic performance when compared to their peers who attend schools located in more prosperous regions. Through a hierarchical structure that includes Cisco Academy Training Centres (CATC), Regional Training Centres (RTC), and Local Academies (LA), the Cisco Networking Academy (CNA) is in charge of supervising the implementation of various programmes. Because they are further removed from the origins of the programme, local authorities (LAs) rarely take part in activities that are directly connected to the Cisco Learning Institute or its CACCs. Conversely, RTCs are selected on the basis of their specialised knowledge and collaborate closely with CATCs in order to accomplish their goals. As an institution advances in the CNA hierarchy, it is anticipated that the level of success of its participants would increase. This is due to the fact that there will be an increase in the availability of physical, educational, and human resources. The following table provides a comprehensive summary of the factors that influence learner accomplishment and the directions in which they influence it, as demonstrated by the findings of studies that were conducted and published in the relevant literature. Regarding the institutional components, more precisely the kinds of institutions and academies that were investigated in this study, there is a dearth of previous research findings.

Method

It was determined that a multilevel data analysis methodology was utilised in order to explore data from five distinct sources. These sources included test accomplishment scores, online surveys, information on class registration, and two open databases maintained by entities of the United States government. The information that was gathered from these sources was divided into two levels: the first level was the student, and the second level was the institution. Adults above the age of eighteen who were enrolled in the CCNA certification classes did not intend to earn a degree but rather a certification. This was evident from their enrollment in the classes. For the purpose of determining the extent to which individual factors have an impact on academic success, the research utilised a hierarchical analysis approach with two dimensions.

Context

The objective of providing comprehensive networking education on a global scale was the impetus behind the development of the Cisco Networking Academy. At the moment, the Academy is being utilised by more than 40,000 persons from 149 different countries. This number includes more than 10,000 secondary schools, community colleges, universities, and non-traditional settings. Among all of the Academy's

programmes, the CCNA programme is the one that commands the most interest. In order to effectively complete the CCNA programme, it is essential that each of the four separate courses that comprise the programme be completed. The first course of the Certified Computer Network Associate (CCNA) programme, which places an emphasis on fundamental skills and knowledge in computer networking, serves as the foundation for this study.

By incorporating both in-person and online learning, the curriculum for the Certified Nursing Assistant (CCNA) provides both teachers and students with an exceptional educational experience. Instructors are given the autonomy to determine how they will instruct their students and to modify the material covered in the course in order to better cater to the requirements of their students during the in-person component. For the purpose of fostering classroom debate, teachers apply a variety of methods, including chapter examinations, discussions in small groups, and regular lectures. Both teachers and students are able to have access to digital course materials by utilising a course management system that is exclusive to the instructional institution.

There is no variation in the final examination that is used to evaluate each and every student.

Participants

This study makes use of data obtained from a comprehensive educational evaluation effort that was carried out in the United States between August 2004 and May 2005, with a particular emphasis on the CCNA programme. An estimated thirty percent of the total population of sixty-five thousand people responded to the questionnaires, which indicates that approximately twenty thousand people participated in the survey. Adult students who participated in the CCNA1 course and filled out the survey at the beginning of the educational experience were included in the sample of data collected for the study. The participants in the survey were given the instruction to provide two specific pieces of information: their age and their enrollment status in the CCNA programme. The purpose of this survey was to collect data for degree attainment. Following the completion of these two investigations, the inclusion criteria for adult learners in this study were formulated and determined. 2442 individuals over the age of 18 who said that they were pursuing a "certificate" or "non-degree" degree were discovered among 256 universities. These individuals were found to be enrolled in the programme. The final criterion was chosen to ensure that adult learners only enrol in the CCNA curriculum with the specific aim of developing their skill set or gaining a technology certification, rather than as a mandatory requirement for formal degree degrees. This was done to ensure that the training is not used as a prerequisite for academic programmes. The material that is provided in Tables 2, 3, and 4 is exhaustive and descriptive in nature towards the persons.

Data Sources and Measures

Exploration and Measurement of Data We used multilevel analysis methodologies to investigate data from five different sources that were acquired from students who were enrolled in the CCNA1 course. These sources included: 1) An online pre-course survey that is administered through the Academy's course management system; 2) Demographic information that is provided by students during the course registration process; 3) An evaluation of the participants' comprehension of the programme through the use of the online final exam; 4) The location of the Academy, which is obtained from the database of the United States Department of Education; and 5) The database of the Department of Housing and Urban Development, which determines

the location of the Academy. After that, the information is separated into two distinct categories: the institutional variables and the participant-level components.

Variables at the participant level are included in Level 1.

At this point, the components are collected from the participants and distributed to the various learners according to their specific needs. We were able to ascertain the genders of the participants by using the information that was gathered from the class registration. For the purpose of determining the participants' employment status, the researchers inquired as to whether or not they were working full-time jobs. A survey question that requested respondents to provide an estimate of their age within one-year intervals ranging from 15 to 65 years of age was used to determine the ages of the individuals who took part in the study. Adult learners' technological capabilities include the following: An individual's self-reported computer skills served as the basis for our technical aptitude criterion. In order to evaluate these capabilities, the survey consisted of four questions, each of which was rated on a Likert scale from one to seven. During the course of the next year, the participants were given the task of evaluating the frequency with which they had carried out activities such as the installation of operating systems, the management of computer hardware, and the provision of technical assistance to other individuals. When the Cronbach's alpha coefficient for the scale was calculated to be 0.88, it indicates that the scale possesses a level of reliability that is sufficient. The motivation of the individuals who participated in the learning process was assessed with the help of a measurement that was modified from the one that Eccles and Wigfield (2002) developed. The value and expectation theory served as the foundation for the construction of the scale. A total of seven factors were rated on Likert scales with five points each, and the results were used to evaluate the projected level of performance and value attributed to the CCNA programme. Considering that the Cronbach's alpha coefficient for the scale was 0.86, it can be concluded that the scale possesses a level of dependability that is of a satisfactory level. An evaluation of the participants' professional aspirations was carried out through the use of a single multiple-choice item in the survey. We awarded a value of zero to the participant's career objective if they did not indicate that they were interested in working in the field of information technology or as a networking specialist. The reasons for enrolling in the class are as follows: What were the reasons that led the students to come to the conclusion that they should enrol in CCNA1? Seven different options are available, and they are connected to education, employment, and recommendations from peers or advisors. A variable was developed expressly for the purpose of analysis, and it was used to categorise explanations that were not related to education and career into one category, while explanations that were not related to these characteristics were placed into another category. The variable was set to zero in the event that there was no information available regarding the participant's motivation for participating in the course, whether it was for reasons relating to their education or their desire to advance their job. The survey employed a continuing learning scale, an inventory of learning abilities and techniques, and nine 5-point Likert scales that were adapted from the works of Oddi, Ellis, and Roberson (1990) in order to assess the respondents' level of desire for lifelong learning. It was determined that the scale had a Cronbach's alpha coefficient of 0.85, which indicates that it had satisfactory reliability. The participants' results in the introductory CCNA course served as the dependent variable in this investigation. The participants' course accomplishment score was the dependent variable. This score was generated by the

percentage of test items that were answered correctly based on the final exam that was administered through the online testing system. Based on the criteria that have been defined in advance, the Cisco Learning Institute is responsible for preparing the final test questions for all CCNA courses.

Level 2: Institutional level factors

The criteria at this level are connected to the educational establishments where adult learners completed their certified nursing assistant (CCNA) programmes. There is a strong connection between the characteristics that are being studied and the capacity of an institution to provide useful instructional resources. Among the offerings of the academy: In accordance with the management structure that was utilised as an indicator variable in this investigation, each and every establishment that provides CCNA courses is classified as either a Local Academy (LA) or a Regional Training Centre (RTC). Societies that place a high importance on the continued development of their economies: Individuals and businesses in areas of the United States who are experiencing economic challenges are eligible to receive targeted economic benefits from the government of the United States. Depending on the context, these areas may be referred to as Enterprise Communities or Empowerment Zones. The economic development of a region and community can be accurately measured with the use of this dependable metric. In accordance with the definition of Empowerment Zones and Enterprise Communities provided by the United States government, seven percent of the academies that are included in our sample are situated in areas that have been publicly acknowledged as representing economic development communities. The usage of indicator variables was utilised in the designation of these establishments.

A classification of the location: By comparing the ZIP codes of each institution to the appropriate locale definition codes included in the database maintained by the National Centre for Education Statistics (NCES), we were able to identify the classification of the locations of each education establishment. There is a range of 1 to 8 for these codes. Urban areas were included in Regions 1 and 2, which were also referred to as centre cities. These regions were utilised for the purpose of classifying institutions. Institutions that were located in suburban areas were assigned a score of either 3 or 4, which indicated that they were placed on the outskirts of the urban central area. Those institutions that were located in regions that were classified as 5 or 6 (urban) were given matching codes, while those that were located in regions that were classified as 7 or 8 (rural) were given codes that corresponded to those regions. Within the scope of the investigation, three indicator variables were utilised: urban, town, and rural. The basic condition was that of a suburban setting. The Certified Nursing Assistant (CCNA) course is open to a variety of educational establishments, including high schools, community colleges (which typically require two to three years of post-secondary education), universities (which frequently require four or more years of post-secondary education), and vocational centres (which include jail facilities and employment centres). During the course of the investigation, we utilised three different indicator variables: a vocational centre, a secondary school, and a community college (with the latter functioning as the reference category).

Analysis

Hierarchical Linear Modelling (HLM), a statistical methodology that takes into consideration several levels of data, was the method that we used to carry out the research. This was done since the individuals in our data were organised in a hierarchical structure inside the institutions. According to Rundenbush and Bryk

(2002), the dataset that we took into consideration was not appropriate for the standard regression methods. When utilising classic regression methods, one of the challenges that can arise is deciding which unit of analysis to use. It is essential to disregard the influence of the organisation while conducting an analysis of data at the participant level at the participant level. It is quite probable that there is a strong connection between the factors that have an effect on persons. There is a possibility that this will lead to type 1 errors as well as an inaccurate inflating of significance. Within the framework of this particular multi-level study design, Hierarchical Linear Modelling (HLM) is utilised for the purpose of conducting an analysis of the data that has been acquired (Hofmann, 1997; Raudenbush & Bryk, 2002; Snijders & Bosker 1995). The present investigation made use of a framework that was divided into two levels, with the participant being placed at level 1 and the institution being placed at level 2. It is possible to calculate the R-squared value for each level, taking into consideration the fact that there are two levels present (Snijders & Bosker, 1999). This will allow one to assess the different influences that institutional and participant factors have on the overall achievement.

Results

Tables 2 and 3 present the descriptive statistics for the factors that determine the participants at the level of the individuals. Each category component was transformed into dummy variables before being incorporated into the multilevel analysis. This was done before the components were fully integrated.

Discussion

The multilevel analysis indicates that the performance of learners in this technology certification programme is influenced by a number of different factors. There were a number of critical characteristics that influenced student success on an individual level. These factors included age, gender, employment position, degree achievement, motivation, and technical aptitude. According to the findings of the analysis, there were no significant elements at the institutional level that had an effect on the achievement of the learners. The performance of adult students was remarkable, and this was true regardless of the sort of educational establishment that offered the CCNA courses. Adult learners in both urban and rural settings revealed performance that was comparable to that of those in suburban settings (Hofmann, 1997; Lee & McIntire, 1999). This finding contradicts the findings of prior study conducted with traditional students attending public institutions. It was possible to draw conclusions about the factors that influence the academic success of adult learners in the CCNA curriculum by conducting an analysis of the average beta coefficients that are presented in Table 5. It was found that the personal demographics of adult learners had a considerable impact on their academic success, given that all other characteristics linked to motivation and ability were unchanged. In order to determine the extent to which these factors have an impact on the outcome, we can compare two participants in the standard programme by making use of the coefficients that are presented in Table 5. A male individual who is 36 years old or older, is employed full-time, and is not actively pursuing a degree earns an additional 27.7 percentage points in comparison to a female individual who is between the ages of 18 and 24 and is not engaged in full-time employment. This particular case is being discussed here. Having said that, it is of the utmost importance to keep in mind that this hypothetical combination of features is merely existing in the realm of imagination and may or may not become a reality. A rating of the relative significance of each component is presented in Table 6, which

makes use of standardised beta coefficients. According to the data presented in Table 6, male students have a higher level of academic achievement than female students. Furthermore, pupils who are employed full-time have a higher level of academic achievement compared to students who are not employed. Moreover, students who are in their senior year perform better than students who are in their junior year, and students who are enrolled in certificate courses score better than students who are not enrolled in degree programmes. The initial degree of technical proficiency that students possess as well as the level of learner motivation that they possess both have an effect on the performance of pupils. Additionally, the association between gender and early motivation has a significant impact on the academic achievement of female students. Additionally, this influence is significant. When compared to the other factors that were investigated in this study, our model revealed that gender was the most significant factor in determining the level of accomplishment attained by learners. The presence of technical competency, motivation, and other relevant characteristics nevertheless play a role in establishing a significant performance difference that tends to advantage male adult learners. This is the case even when institutional and demographic issues are taken into account. (Kennedy, 2000; Schreiber, 2002) Research reveals that women perform less well than men in mathematics, science, and technology classes. This information is supported by research. The student body of the CCNA programme is composed of more than 85 percent male college students. It is possible that this will have a major and detrimental effect on the achievements of women. Within the context of the CCNA curriculum, it was discovered that the second most significant factor determining students' success was their age. For the CCNA1 course, the older learner groups, notably those aged 25-35 and 36 and beyond, had a higher level of performance than the participants in the age range of 18-24 years old. According to the findings that were presented in earlier study that Justice and Dornan carried out in 2001, the current outcome is in agreement with those findings. A plausible reason for this result could be because younger and older learners have different levels of cognitive development, different life experiences, and different academic skills that they have acquired throughout the course of their education. Unanticipated was the effect that having a full-time work would have on the progression of students in that particular way. One study found that students who worked full-time achieved a higher performance than those who did not work, with a difference of 4.52 percentage points. This finding contradicts the findings of prior studies and the general consensus. There was no significant link found between the employment component and the aptitude, motivation, or demographic factors that could be clarified by the data that was available. It is likely that participants who were employed had better time management and study skills compared to those who were not employed. Alternatively, it is also feasible that the content of the CCNA course was more relevant to individuals who found themselves in full-time employment. An additional notable finding that emerged from this analysis was that adult learners who were not pursuing a degree had a 3.26 percentage point improvement in comparison to learners who were engaging in certificate programmes. As an alternative to earning a degree, learners who are not interested in obtaining a degree choose to participate in the Certified Nursing Assistant (CCNA) training programme. Despite the fact that the existing body of evidence says otherwise, participants who did not have a defined degree target earned superior performance in the programme compared to those who had a specified certificate goal. It is necessary to do additional research because the

interactions between these component and other variables led to implications that were statistically insignificant. There was a correlation between the value and expectations of the programme, as well as the motivating indicators, and the development that adult learners who were participating in the CCNA training made. According to what was anticipated, those who participated in the workshop and gave the course a high rating witnessed more substantial gains. Previous research (Allen, 1999; Eppler & Harju, 1997) has demonstrated that non-traditional undergraduate students have similar outcomes to those observed in the current study. Throughout history, the ability of the learner has been seen as an essential component in determining the level of achievement (Stinson, 2004). There is a clear indication from the data that the CCNA training is necessary for adult learners. In the CCNA1 course, students who held a high level of technical skill in computers performed more effectively than students who lacked these abilities. This was evident in the students' overall performance. Despite this, there was no significant interaction between technical competence and any of the other variables. There was no correlation between the other participant-level variables and the success of the course. These criteria included career aspirations, motivation for lifelong learning, and reasons for enrolling in the CCNA1 course. Despite the fact that these elements have been interpreted as indicators of continuous learner involvement and uninterrupted learning, the impact that they had on the achievement of CCNA1 course objectives was negligible. This research, in contrast to previous studies, found that there were no noticeable differences in the academic achievement of adult learners between regions with higher and lower levels of wealth, geographical locations, regional training centres, and local academies. The body of research does a comprehensive job of documenting the differences in academic success that exist between different socioeconomic and geographical regions. When compared to their peers who attend schools in economically developed or suburban areas, students who attend schools in economically challenged regions, urban and rural locations, or both display worse academic performance (Kozol, 1991; Lee & McIntire, 1999; Lippman, Burns, & McArthur, 1996; Walberg, 1984; Young, 1998). On the other hand, our findings indicate that differences in geography have a negligible impact on the academic performance of students.

Conclusion

The findings of this study have the potential to have a significant impact on educational practice by suggesting improvements to the stages of design, development, and implementation of technology certificate courses on computer systems that are accessible to adult learners. On the basis of the findings, a number of recommendations can be made that have the potential to influence the progression of students in blended or hybrid learning environments that are comparable to the CCNA programme that is being investigated. When it comes to any programme that incorporates technology, the gender of the students will have a big influence on the amount of accomplishment that they attain. According to the findings of our study, the assertion that males do better than girls is widely acknowledged in the academic literature. In order to guarantee that female students enrolled in technology programmes attain academic performance that is comparable to that of their male counterparts, teachers and programme designers need to find and implement solutions that provide enhanced support that is specifically geared to female students. There is a significant relationship between the level of motivation that each learner exhibits and the level of success that

they realise during the CCNA course. However, in comparison to women, men are less affected by this particular facet of the situation. It has been found that women who are extremely motivated tend to achieve more than women who have lesser levels of motivation. This observation is based on the fact that there is a correlation between motivation and gender. For the purpose of enhancing the perceived value and expectations of female participants in technology courses, it is essential to give them with appropriate information about the relevance of these programmes in their day-to-day lives prior to their participation in the programmes. One of the most important findings that emerged from this research was discovered to be connected to the achievements of those who are employed on a full-time basis. The results of the CCNA1 course showed that those who were working full-time during the course achieved higher scores than those who were not working. This finding contradicts the findings of previous studies. Given the information that is now available, this discovery seems unfathomable. The fact that there are no differences in academic achievement between different institutions and geographical places is another remarkable discovery that was made. The structure and design of the CCNA curriculum serve to cultivate a learning environment that is encouraging and supportive for adult learners. This environment provides individuals with an equal opportunity to flourish and realise their full potential. There is a widespread belief that the implementation of standardised curriculums and the use of online testing played a part in the development of this issue. The same instructional materials and learning tools are made available to students from all academies and areas in an equitable manner. By providing education online, teachers are able to redirect their time and energy away from administrative tasks such as managing the classroom, preparing the curriculum, and providing feedback to students, and instead focus on in-class activities and student participation. The findings of this study indicate that the level of education received by each participant in the technology certificate course is consistent and equal, regardless of the educational institution or geographical area where the programme is provided. It's possible that this could be considered an educational advantage that is associated with hybrid training or blended learning scenarios. The limitations of this research endeavour were severe, just like those of previous large research studies. To begin, the fact that this examination is conducted using an online data collection approach means that it is subject to the typical limitations that are associated with survey research. The findings are a reflection of the students who participated in the survey and chose to do so. Unfortunately, it was unable to identify whether or not our sample was representative. Survey items that rely on self-reporting, namely those linked to the value of the programme and the capabilities of the computer, have the potential to induce bias owing to social desirability. This is because of the fact that people are more likely to report their own opinions. There is a possibility that the findings of this study will have substantial repercussions for subsequent investigations. Initially, our model estimated that the parameters that were being investigated may possibly explain 19.6% of the variation in adult performance in the CCNA1 course at the institution level, and 11.8% of the variation at the student level during the course. The scores on the achievement test continue to display a considerable amount of variability that cannot be explained. It is required to do additional research in order to assess the influence of various learner and institutional features on the academic accomplishment of adult learners. These characteristics include student involvement, instructional approaches, and the instructor. Furthermore, it is anticipated that the academic achievement of

students who work full-time will be equivalent to, if not worse than, that of students who do not work full-time. This hypothesis is supported by the current research. In spite of this, the findings of our study indicate that students who are employed on a full-time basis obtain higher levels of academic success in comparison to their peers who are not employed. In further investigations, a comparison analysis of the academic experiences, job histories, time allocation, and study skills of students who are employed full-time and those who are not employed full-time should be carried out. In order to study the relationship between student participation in the programme, the amount of time it takes to finish activities, the use of active learning methods, and the factors that were described earlier in relation to academic achievement, additional research is required. As an additional point of interest, it is plausible to claim that inquiries into local teaching techniques may provide significant knowledge regarding the ways that are the most effective. At the local level, the use of particular instructional strategies has the potential to boost performance. Having a grasp of these methods makes it much simpler to devise strategies that encourage and help persons in enrolling in certification programmes for various types of technology. It should be brought to everyone's attention that there are no discernible differences in academic achievement between different institutions, socioeconomic backgrounds, or geographical areas. The current study shed light on the significant factors that have an effect on the accomplishments of adult students who are enrolled in technology certificate programmes. Further inquiry is required in order to acquire a comprehensive understanding of this phenomenon. When doing research, it is essential to take into consideration a number of different aspects, such as the level of effectiveness of the instruction, the educational materials that are utilised, and the degree to which both the instructors and the students are pleased with the programmes that are provided by these institutions.

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